



CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

Volume 33
Number 1
January 1962



SHOUT
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New Maori Family “AT HOME” IN POLYNESIAN HALL

IN THE HISTORY of the South Pacific the Maori of New Zealand stand out as an exceptional people. Not only did they attain excellence in government, in navigation, and in the art of warfare, but—more importantly—their achievements in the decorative arts, in music, and in poetry stand as enduring reminders of the sophisticated and artistically sensitive society they were able to develop in an isolated area of the world.

During January the Museum will focus on the Maori in a new featured exhibit-of-the-month—a life-size reconstruction of a typical family scene in a Maori council house in New Zealand shortly after the coming of the white man. The exhibit is located in the Museum’s Hall of Polynesian and Micronesian Cultures (Hall F, ground floor, east), which opened earlier this year.

Illustrations:

Artist-preparator Susan Schanck works on life-size models for new permanent exhibit in Maori Council house.

The exhibits were prepared under the direction of Dr. Roland Force, Curator of Oceanic Archaeology and Ethnology.

Photographs, including cover, by John Bayalis and Homer Holdren.



Set against a patterned background of colored woven mats, the reconstructed family of seven includes two children, who are playing happily on the floor and do not seem to mind their lack of clothing, in spite of chilly weather. Their grandmother sits opposite them smoking a carved pipe. Off in the corner grandfather is dozing, while another man sleeps on a floor mat. Nearby, an imposing Maori chieftain, with face completely tattooed, has risen to welcome a male visitor. Across the shoulders of both men are draped feather capes of exquisitely blended colors. Around the chief's neck is a valuable *hei-tiki*—a greenstone neck-pendant representing the Maori deity, Tiki, the father of mankind. The children are playing cat's cradle, a game which their pipe-smoking grandmother appears to be enjoying as much as they. In the Maori fashion for women, grandmother is tattooed only around her mouth. Carved feather-boxes, ancestor figures, and a variety of weapons complete the interior scene.

The council house providing the setting for the family group is nearly 60 feet long, 20 feet wide, and 14 feet high inside. It is one of the largest and finest on exhibit in the world today. Maori council houses more than 25 feet long were always exceptional, and very few houses of any size have been preserved. The council house is also the only one now in existence with a completely



carved front. Incorporated in the entrance design are many eye-shaped pieces of abalone shell.

The Museum's featured exhibit clearly demonstrates the universality of the spiral (*pitau*) in Maori decorative art. Supposedly the *pitau* evolved from the study of natural objects (the term is derived from the first unfolding fronds of the fern tree). The web of the spider, the wave-like markings on sandstone cliffs, and the markings on one's thumb, all have been given by the Maori as being the original sources on which the carver and tattooer based their designs. The spiral is everywhere in Maori decorations—in their carved houses, in canoe figureheads and stern-posts, and in the elaborate tattooing on their faces and hips. The reconstructed family group uses authentic examples of Maori decorative arts to create a scene that is accurate to the most minute detail.

A Polynesian people, the Maori are believed to have been the original inhabitants of New Zealand. Unlike many other native peoples of the South Pacific, however, the Maori did not die out with the coming of the white man. Instead, they have taken their place in the economic and social life of the new society that has grown up in New Zealand under the British.

MARILYN K. JINDRICH

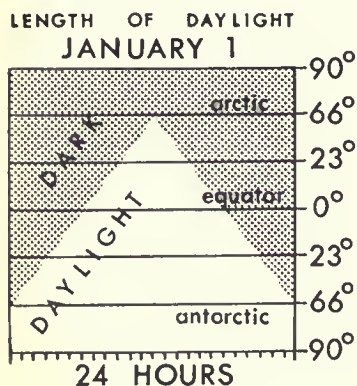


January through the

By DR. AUSTIN L. RAND,

THE seasons follow the sun, which reaches its southernmost point on December 22, nearly over the southern tip of Florida. The movement of the sun is caused by the tilt of the earth's orbit around the sun. In the northern hemisphere, the sun's rays are slanted for six months of the year. In the south, the sun is overhead from the sun, has its southern winter and summer, is, of course, true during the southern summer.

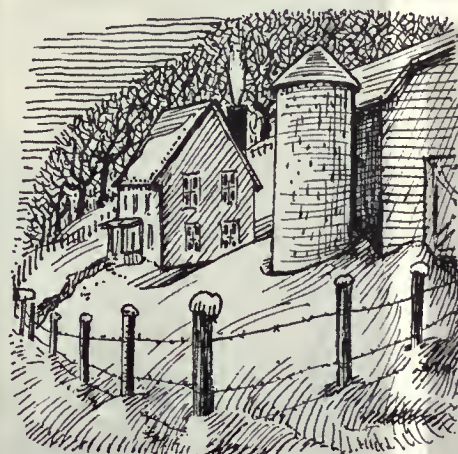
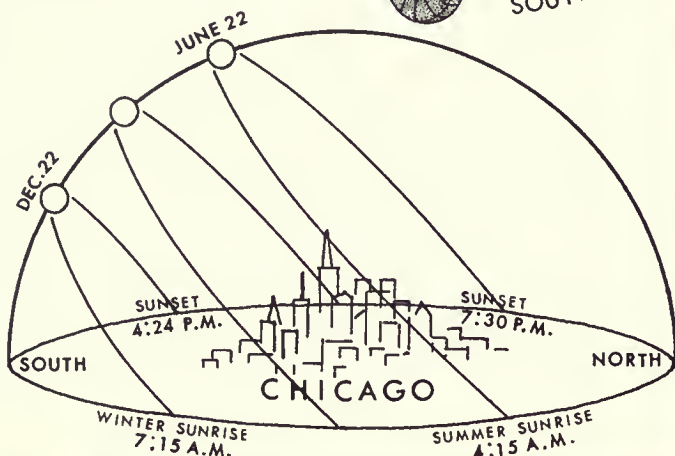
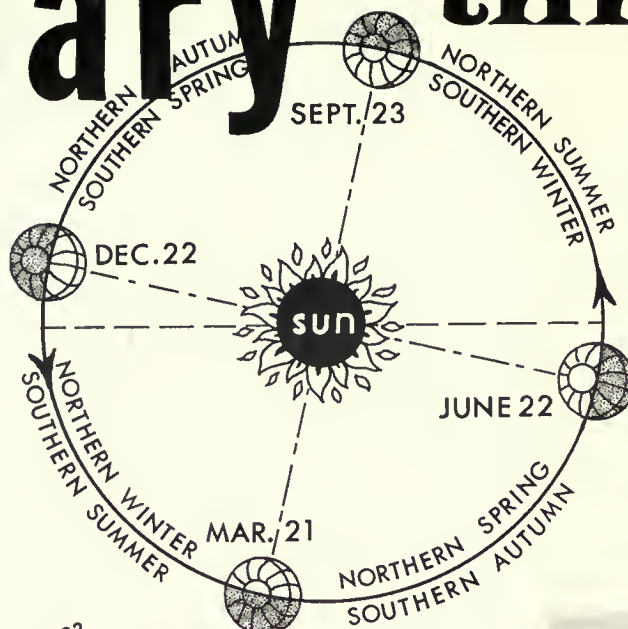
In the temperate and polar regions the sun is low in the sky, producing the succession of the seasons: winter, spring, summer, autumn. But in the tropics, where the sun is always overhead, seasonal changes they are correlated with the amount of rain. The wet season stimulates the greater amount of reproduction. The dry season is very severe, some species also



Above: The duration of daylight through the latitudes.

Upper right: The earth in its orbit around the sun.

Right: The course of the sun in the sky, summer and winter, over Chicago.



NOR

Chicago, Pole and it is the winter, v The land woodlots pines; fro cattail; shore an are snow few insect are many —also cl rows, and and squi meadow



TROPICS

Barro Colorado, in latitude 10°N.: Here the average January temperature is 80°F.. There is no spring, summer, autumn, and winter based on temperature. Rather, January is the end of the wet season and the beginning of the dry; only certain trees lose their leaves, but the forest floor is carpeted with rustling dead leaves. Balsa trees are loaded with vase-like, ivory-colored flowers six inches long, and to these come a dozen species of birds—parakeets, hummingbirds, tanagers, and honeycreepers—monkeys, and insects, to eat flower parts or juices. Another big forest tree bears ripe, two-inch nuts with a thin, fleshy coating. Raccoon-like coatis and howling monkeys climb among the branches, pick the nuts, eat off the flesh, then drop the nuts. These are scooped up from the ground by agoutis and peccaries.

TROPICS AT EQUATOR

The mouth of the Amazon River, in latitude 0° near Para (Caripi): It is early January, with cloudless blue skies; a sea breeze; the murmur of water on the beach. The river bank is masked with lofty walls of green trees, and there are many palms. In the clearings are palm-thatched huts; beyond are groves of bananas, mango trees, cotton, and papayas. Orange trees are loaded with blooms, about which hummingbirds whirl. At dusk, moths come to the flowers, and bats emerge from the red tiles of the house roofs. In late January, the dry season abruptly ends. On the first rainy night tree frogs, crickets, goatsuckers, and owls join in a deafening chorus. In the daytime, dragonflies swarm and winged ants and termites come forth in great numbers.



TROPIC EDGE

Southern Florida, in latitude 23°–24° N.: This is the average January temperature of 71°F., with from occasional years and a growing season of 365 days. In the temperate zone concept of summer and winter. It is summer, judging by swallows feeding green, wet prairies, the flowers in the gardens, activity of butterflies and dragonflies. Ocean fishing continue, but it is late summer or autumn time judging by the green vegetables and ripe on the shore birds on the beaches; winter, judging by the less cypress and gumbo limbo trees, the need for houses for warmth some days; and spring, judging by the nesting of herons. A visitor from the tropics would recognize the palms and bamboos familiar, would recognize the bougainvillea and hibiscus, caladium and croton.

SOUTH TEMPERATE

The La Plata River in Argentina. It is the hottest month of the year. The January temperature of 70°F. is the season for birds, which is past; rheas and tinamous on the plains; many of the still here, and will not winter home in Brazil. The equator refugees from the barn swallows, bobolinks, the many sandpipers, of months ago on the vast of the pampas, will stay.

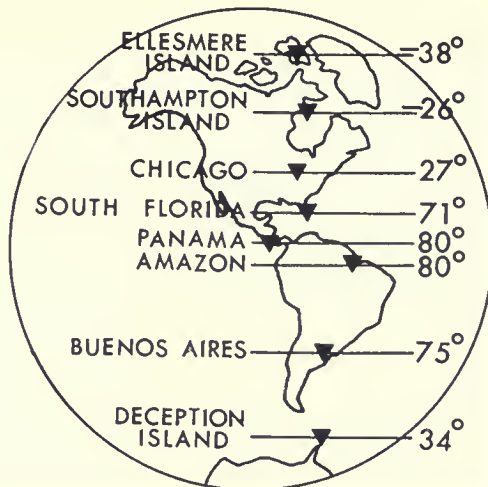
the LATITUDES

designed and illustrated by
e. john pliffner, staff artist

Chief Curator, Zoology

its farthest point north on June
and its farthest point south on
aneiro. This apparent move-
earth's axis to the plane of the
summer, the North Pole is pre-
light, while the South Pole, away
months of darkness. The reverse

brings warmth and withdraws
t, summer, autumn, and winter.
rly overhead, while there are
mount of rainfall, so that dry
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w and reproduce then.



TEMPERATE

atitude 42° about halfway between the North
quator (2,800 and 2,600 miles away): Here
le of the coldest month of the northern
average January temperature of +27°F.
is of snow-covered fields, grey leafless
ak or maple, occasional groves of green
onds rimmed with leafless shrubs and dead
Michigan with an ice barrier along the
ting wind-driven ice fields. Farmsteads
and plant life is dormant; many birds, a
d some bats have migrated south. There
er birds, such as ducks, on Lake Michigan
ees, woodpeckers in woodlots, tree spar-
ow hawks in the fields. Raccoon, rabbits,
eave trails in the snow, while shrews and
live in burrows beneath it.



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The peak of the breeding
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thern winter, such as the
llow-billed cuckoos, and
arrived in force a couple
ns and the flooded ponds
er couple of months.



HIGH ARCTIC

Western Ellesmere Island, in latitude 80°N., about 600 miles
south of the North Pole: This is the middle of the arctic night,
where the sun does not appear above the horizon for four
months, and the depth of the arctic winter, where the aver-
age winter temperature is -38°. The annual average tem-
perature is -4°F., and arctic conditions are extreme. It is a
country of glacier-topped mountains; bare ridges blown clear
of snow, exposing rock, gravel, and sparse, scattered, dwarf
plants; and snow drifts up to 100 feet deep in sheltered
places. The rivers and lakes are frozen shut, and new ice,
six feet or more thick, joins the coast with the equally thick
ice fields covering the polar sea. All the land birds have long
since departed, as have the many shore and water birds
which nested in June. Musk ox feed on exposed plants;
lemmings in burrows under the snow.



LOW ARCTIC

Southampton Island, in latitude 64°N.: It is midwinter,
with a temperature average of -26°F., and extremes of
-60° and +32 F. The tundra snow cover varies from a
few inches to snowbanks 20 feet deep—at most, a few twigs
of dwarf willow stick up through the snow. Four to eight
feet of ice cover the lakes, and there is a foot of snow on the
sea ice which locks fast the shoreline and extends far offshore
to where waves keep the sea from freezing. The sun comes
above the horizon for only a short time at midday. Caribou
and arctic hares feed in the open; lemmings under the snow;
seals and white whales at the edge of the ice. Wolves, arctic
foxes, weasels, polar bears, ptarmigan, and snowy owls live
on the land; eiders, murres, and gulls at the open water. The
female polar bears bear young in chambers in the snow.



ANTARCTIC

The Antarctic Archipelago ("Palmer Land," "Graham
Land," etc.), in latitude 62°-70° south: The average January
temperature is 34°F. This is the middle of the southern
summer, with a prolonged antarctic day in a land of extreme
polar conditions. Mountains rise to 10,000 feet, and even
in summer the snow falls faster than it melts, so that snow
lies everywhere except on steep slopes. Much of the adja-
cent sea is covered with pack ice. Vegetation, all low and
herbaceous, is at a minimum, and the few land invertebrate
animals are active for but a small part of the year. About
25 species of birds have been recorded in the archipelago,
but some, such as the albatrosses, are wanderers from more
northern latitudes. Some 15 species of birds breed, drawing
all their sustenance from the sea; these include penguins, a
cormorant, a sheath bill, skua, a kelp gull, and the antarctic
tern, which have eggs or young in January.

Trustees Meet

At its December meeting, the Board of Trustees elected four members to fill vacancies on the Board. They are Bowen Blair, investment banker, John M. Simpson, steel executive, John Shedd Reed, railroad executive, and Clifford C. Gregg, the Museum's Director.



Bowen Blair



John M. Simpson



John Shedd Reed



Clifford C. Gregg

Mr. Blair is a graduate of Yale University and is a Partner in the firm of Wm. Blair & Co. He is a son of William McCormick Blair, President of The Art Institute of Chicago and a member of the Museum's Board.

Mr. Simpson, President of A. M. Castle & Co., steel distributors, is a graduate of the University of Chicago. He is a son of the late James Simpson, who was a member of the Museum's Board and who contributed the James Simpson Theatre to the Museum.

Mr. Reed is a graduate of Yale University and of the Advanced Management Program at Harvard. He is Vice-President in charge of Finance of the Santa Fe Railway.

Dr. Gregg has been with the Museum since 1926 and has been Director since 1937. He is a graduate of the University of Cincinnati and is a retired Colonel in the United States Army Reserve.

At the meeting, the resignation of Clarence B. Randall, Trustee of the Museum since 1946, was accepted with regret. Since his retirement a few years

ago as Chairman of the Board of Inland Steel Company, he has been active as an economic adviser in the interests of the Federal Government. Mr. Randall cited the pressure of other duties and his inability to attend the Board meetings as the reasons for his resignation.

In Memoriam

Just as the *BULLETIN* was going to press, we received word of the death on December 13 of Captain A. W. F. Fuller of London, England. Captain Fuller devoted his life to the assembling of what is recognized as the world's finest collection of Polynesian and other Oceanic artifacts. His splendid collection came into the possession of the Museum in 1958.

Captain Fuller was devoted not only to Oceanic ethnology but became a devoted member of the Museum. His splendid assistance in documenting his collection and his generosity in presenting to the Museum some especially fine pieces he acquired after the purchase of his collection caused the Board of Trustees in January of 1959 to elect him a Patron of the Museum. Subsequently, he was elected a Contributor, and in November 1961 he was elected a Benefactor. His deep interest in the Museum and in his collection continued even to the hour of his death. His death is a blow to the science of ethnology and he is deeply mourned.

Museum Events

"An Evening of Renaissance and Baroque Music"—the fourth program in the 1961-62 series offered by the Free Concerts Foundation, Mrs. J. Dennis Freund, sponsor—will be presented on Monday, January 8, at 8:15 P.M. in the Museum's James Simpson Theatre.

The program consists of vocal and instrumental solos, and vocal ensembles, both accompanied and *a cappella*, by the following musicians: Charles Bressler, tenor; Huges Cuenod, tenor; Albert Fuller, harpsichord; Donald Gramm, baritone; Thomas Paul, bass; and Joseph

Chicago Natural History Museum

Founded by Marshall Field, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

Telephone: WAbash 2-9410

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*Resigned

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THE BULLETIN

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Clifford C. Gregg, Director of the Museum

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Marilyn Jindrich, Associate in Public Relations

Members are requested to inform the Museum promptly of changes of address.

Iadone, lute. Among the composers whose works will be heard are Costeley, Milan, Monteverdi, Morley, Dowland, Couperin, Scarlatti, de Mudarra, and Clerambault.

For free tickets, please send a stamped, self-addressed envelope to the Museum, Roosevelt Road at Lake Shore Drive, Chicago 5.

On February 3, Free Concerts Foundation will present an *a capella* concert by the Netherlands Choir, under the direction of Felix de Nobel. Tickets will be available after the concert on January 8.

The Chicago Chamber Orchestra, under the direction of Dr. Dieter Kober, will present a series of nine free concerts in the Museum's James Simpson Theatre on selected Sunday afternoons from

January through May. The complete list of dates is as follows: January 7 and 21, February 25, March 4 and 18, April 1, 15, and 29, and May 13. On January 7 will be heard the Suite No. 3 in D by Bach, Haydn's Symphony No. 60 in C, and Franz Waxman's Sinfonietta for String Orchestra and Timpani. On January 21 the program will include the Suite No. 2 in B by Bach, Mozart's Andante for Flute (K. 315), Wagner's Adagio for Clarinet and Strings, and the Chicago premiere of Bernard Heiden's Concerto for Small Orchestra. Admission is free and without ticket. Complete program information for this series of Museum concerts, as well as a schedule of the orchestra's other appearances, may be obtained from the Chicago Chamber Orchestra Association, 332 S. Michigan Ave., Chicago (HA 7-0603).

On Sunday, January 28, the Illinois Audubon Society continues its wildlife film-lectures with "Nova Scotia—Land of the Sea," by Robert C. Hermes. This color motion picture records a visual journey through the spruce and hemlock forests in Canada's lovely province-by-the-sea. The lecturer follows a tiny stream from its woodland source to the

Atlantic, where time-lapse photography focuses on the Minas Basin tides and the changing patterns of oceanic life. The free film will be presented at 2:30 P.M. in the Museum's James Simpson Theatre.

The deadline for entries in the 17th Chicago International Exhibition of Nature Photography is January 15. The exhibit of photographic work will be presented in the Museum from February 3 through 18, with showings of slides in the James Simpson Theatre on February 4 and 11 at 2:30 P.M. Photographers wishing to enter the exhibition may obtain entry forms from Frank Pfleger, exhibition chairman, 2347 Harvey Avenue, Berwyn.

Staff Changes

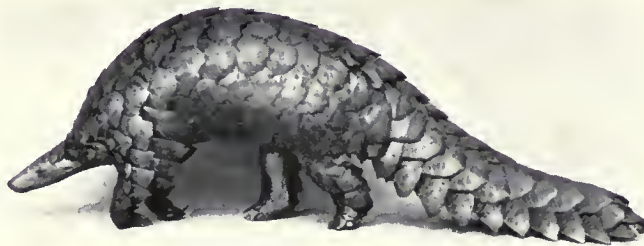
Dr. Joseph Curtis Moore is joining the staff of the Museum on January 1, 1962, as Curator of Mammals. Dr. Moore attended the University of Kentucky and received a doctorate at the University of Florida. He spent several years with the National Park Service in the capacity of Park Biologist at the Everglades National Park. He is also a Research Fellow of the American Museum of Natural History in New York.

Dr. Moore has been a prolific writer of both scientific and popular reports in the fields of his interest.

Mr. Philip Herskovitz, who has been Curator of Mammals at the Museum since January 1, 1956, and served as Assistant Curator and Associate Curator since March, 1947, will become Research Curator of Mammals. In this capacity he will be able to devote more time to the studies he has been conducting.

Mrs. Dorothy Gibson, secretary in the Department of Botany, has been appointed Assistant in that department. Her appointment comes as the result of contributions she has made to botanical research while in the service of the Museum. Since joining the Museum's staff in 1958 she has acquired, through outside study and through working with the herbarium, a basic knowledge of systematic botany. Studying plants has long been an avocation of Mrs. Gibson. Her extensive collections from her native state of Kentucky have been deposited in the Museum's herbarium, and formed the basis for her "Life Forms of Kentucky Flowering Plants," published (Continued on next page)

What Is It?



No, the peculiar animal pictured is not a dinosaur or even a "living fossil" that has survived from some prehistoric age. It is a pangolin, an ant and termite-eating mammal found in Southwest Africa and parts of Asia. Most pangolins grow 15 or 16 inches long, excluding the tail, although a few giants have been known to reach the size of a small sheep. The most striking feature of the animal's appearance are the horny, overlapping scales that cover all but the under part of the body. It has been claimed that the scaly plating of a mature pangolin is so strong and streamlined that it will ward off a .303 bullet fired point blank from a distance of 100 yards. When forcefully snapped together, these scales are said to be capable of cutting off the paws of an attacking animal. Small wonder that African Bushmen and other native tribes use the scales as charms. The pangolin's strong front claws, which extend backward as it walks, are well adapted for digging into and breaking open the hard mud nests of termites so that the mammal may extend its sticky foot-long tongue into the nests' tunnels to scoop up their inhabitants. A pangolin may be seen in Hall 18 during January and February. MKJ

lished recently in *The American Midland Naturalist*.

The retirement at the close of the year of Emil Sella, Curator of Exhibits in the Department of Botany, is announced with regret. Mr. Sella joined the staff of the Museum in 1922 as a glassblower and preparator in the Stanley Field Plant Reproduction Laboratory of the Museum. He advanced over the years to Chief Preparator of botanical exhibits and in 1947 was appointed Curator of Exhibits in the Department of Botany. Hundreds of plant models at the Museum bear silent testimony to his unusual ability and skill in reproducing in permanent form a wide variety of plants.

Mr. George Langford, Curator of Fossil Plants, also retired at the end of the year. Mr. Langford came to the Museum in 1949 after his retirement from a business career. A native of Denver, Colorado, he graduated from Sheffield Scientific School of Yale University in 1897. His great interest in the coal fossils in the strip mine areas of Wilmington, Illinois, and his general interest both in paleontology and certain phases of anthropology brought him to the Museum first as a volunteer and later as a staff member.

Dr. C. Earle Smith, Jr., Associate Curator of Vascular Plants, resigned at the end of the year to accept employment with the United States Department of Agriculture. He will be stationed at Beltsville, Maryland. Dr. Smith joined the staff of the Museum in January of 1959 and has been interested especially in tropical vegetation.

BROR ERIC DAHLGREN 1877 — 1961

Dr. B. E. Dahlgren, Curator Emeritus of Botany, died of a heart attack at his home on December 16, 1961. This ended a varied career that began with emigration from his native Sweden to the United States when he was in his teens. After receiving his degree from the University of Minnesota, Dr. Dahlgren engaged in the practice of orthodontic dentistry in New York City at the turn of the century. His studies of the comparative

anatomy of the mammalian palate led to use of the collections at the American Museum of Natural History, and subsequently to an interest in problems of museum exhibition. Employing some of the materials and techniques of mechanical dentistry, Dahlgren constructed models of invertebrate animals, including insects, that were superior to any known at the time. Eventually he gave up the practice of dentistry and became a staff member at the American Museum.

In 1909, Dr. Charles W. Millsbaugh, the Museum's first Curator of Botany, with the support of Mr. Stanley Field, President, induced Dahlgren to become head of the department's Division of Modeling. In 1935 Dr. Dahlgren became Curator of Botany, a title that was changed the following year to Chief Curator of Botany.

Under his direction a program of botanical exhibition was begun that resulted in the famed Stanley Field Collection of Plant Models and botanical exhibits considered to be the finest anywhere. Among the most spectacular of these is the restoration of a Carboniferous forest on display in Hall 38 of the Museum. Illustrations of this restoration have appeared in most textbooks of geology published since the completion of the exhibit.

Dr. Dahlgren was an authority on wax palms and conducted a number of botanical collecting expeditions to Jamaica, British Guiana, Brazil, and Cuba.

Scientific Meetings and Honors

The government of Guatemala has honored two former staff members of Chicago Natural History Museum for scientific work accomplished relating to that country. On September 15, Dr. Julian Steyermark received Guatemala's "Order of the Quetzal" from the Guatemalan government at Caracas, Venezuela. The same honor was bestowed on Mr. Paul C. Standley at Tegucigalpa, Honduras, on October 11, 1961. The honors were bestowed in recognition of the scientific studies of these botanists on the flora of Guatemala.

Rupert L. Wenzel, Curator of Insects, has returned from a trip to the Canal Zone where he worked and conferred with Major Vernon J. Tipton, U. S.

Army. Wenzel and Tipton are writing a paper on the butterflies of Panama. The study is part of a U. S. Army-sponsored research program directed by Major Tipton, who is Chief of the Environmental Health Branch of the Division of Preventive Medicine, U. S. Army Caribbean.

Dr. Paul S. Martin, Dr. Donald Collier, Dr. Roland W. Force, Mr. Phillip H. Lewis, and Mr. George I. Quimby, all of the Department of Anthropology, recently attended annual meetings of the American Anthropological Association in Philadelphia. Mr. Lewis presented a paper on "Comparison of Art of Primitive and Civilized Societies." His monograph, *A Definition of Primitive Art*, has just been published by the Museum Press (Fieldiana: Anthropology, Vol. 36, No. 10; 21 pages, 5 illustrations; 50c). At



Effigy hanger, New Guinea. Illustration from "A Definition of Primitive Art"

the meetings, Dr. Force discussed "The Concept of Process and the Study of Cultural Change." Dr. Force is now en route to his new post as Director of the Bernice P. Bishop Museum in Honolulu, Hawaii.

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VOLUME 33
NUMBER 2
FEBRUARY
1962



Blind children encounter 3,275-pound meteorite
during Museum workshop on geology of earth and outer space.

New Director Chosen

The Board of Trustees of Chicago Natural History Museum, at its January meeting, elected a new Director, a new President, and a new Chairman of the Board.



E. Leland Webber



Stanley Field

Mr. Stanley Field, who has served as President of the Museum since 1909, was relieved of that duty at his own request and elected to the new position of Board Chairman. During his 53 years as President, the Museum developed into an institution of worldwide reputation, known for its scientific research and its outstanding collections. It is worthy of note that Museum attendance in 1909 was 209,170 against 1,307,567 in 1961. Expenditures in 1909 were \$312,934.98 compared with approximately \$1,500,000 in 1961. In his new capacity, Mr. Field will continue to be intimately associated with the work of the Museum which has made such phenomenal progress under his direction.

The new Director is Mr. E. Leland Webber, who joined the staff of the Museum in 1950. After serving as Executive Assistant to the Director, he was appointed Assistant Director in 1960. He has been active in the American Association of Museums and the Midwest Museums Association. He is also a member of the American Association for the Advancement of Science, and the Association of Science Museum Directors. Mr. Webber lives in Wilmette, Illinois, with his wife and three children, and has been active in community and church affairs.

He succeeds Clifford C. Gregg, who has been Director of the Museum since

1937 and who was elected President of the Museum, succeeding Mr. Field.

Free Lectures and Films

The Museum's 1962 spring series of illustrated travel lectures for adults will begin with a film trip to Mandalay on March 3, followed on March 10 by a motion picture excursion to Germany. Travel-lecturer for "The Road to Mandalay" is William Moore, with Gordon Palmquist—a familiar lecturer on the stage of James Simpson Theatre—providing the narrative for "Germany." The complete schedule for the spring travel lectures will be announced in the March BULLETIN. The programs to be presented each Saturday during March and April begin at 2:30 P.M. Reserved seats in the James Simpson Theatre will be held for Museum Members until 2:25 P.M.

The Saturday morning programs for children will also be listed in the March BULLETIN. They begin on March 3 at 10:30 A.M. in the James Simpson Theatre.

"Once Around the Sun," a motion picture-lecture explaining why the seasons change, the tides ebb, and the days turn to night, is the February 18 program of the Illinois Audubon Society's current wildlife film series. The program begins at 2:30 P.M. in James Simpson Theatre.

Free Choral Concert

The Netherlands Chamber Choir, directed by Felix de Nobel, will be presented in James Simpson Theatre by the Free Concerts Foundation on Wednesday, February 7, at 8:15 P.M., in a concert of a *cappella* music dating from the 16th Century to the present. (The date has been changed to February 7 from February 3, as listed in last month's BULLETIN.) The choir will sing selections by Morley, Farmer, di Lasso, Barber, Ravel, and others. Free tickets may be obtained by sending a stamped, self-addressed envelope to Free Concerts, Chicago Natural History Museum, Roosevelt Road at Lake Shore Drive (5).

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THE BULLETIN**EDITOR**

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CONTRIBUTING EDITORS

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John R. Millar, Chief Curator of Botany
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Austin L. Rand, Chief Curator of Zoology

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Members are requested to inform the Museum promptly of changes of address.

Nature Photo Exhibition

Nature photographs from all over the world will be on display in Stanley Field Hall February 3 through 18 in the 17th Chicago International Exhibition of Nature Photography. Sponsored jointly by the Museum and the Nature Camera Club of Chicago, the exhibition is the largest in the world devoted to nature photography, and comprises several hundred of the best of more than three thousand entries. The entries include both color and black-and-white prints, and color slides of scenic and unusual natural phenomena, plant life, and animal life photographed by both amateur and professional photographers. The exhibition's most outstanding slides will be shown in James Simpson Theatre on February 4 and 11 (Sundays) at 2:30 P.M.

February's Featured Exhibit

The Cannonball Tree

John R. Millar, Chief Curator of Botany

IN A WORLD full of strange and curious things, the cannonball tree ranks high on the scale of the unusual among tropical trees. It is native to Guiana, the general region of northeastern South America, where it grows as a tall forest tree. A few examples have been established in Florida, one at the Fairchild Tropical Garden in Coconut Grove and another in the garden of the Royal Palm Hotel, Fort Meyers. The name "cannonball" derives from resemblance of the reddish brown, six to eight-inch spherical fruits to old-time, rusty artillery shells.

The tree bears large, showy flowers with five to seven fleshy petals colored crimson on their inner surfaces. The crimson color blends to white at the base of the petals where they surround a peculiar hood-like structure bearing two sets of stamens. Numerous short stamens cover a flat disc at the center of the flower while a fleshy, white, recurved extension of the disc terminates in an equally numerous set of larger, tentacle-like stamens. Large black bumble-bees that seem to be the principal pollinators thus are dusted top and bottom with pollen as they force their way under the hood. Flowers and fruits are borne on pendulous branches located on the lower part of the trunk well below the leafy crown of the tree. These branches, gnarled and woody as they seem, are appendages of the inner bark and are not united with the wood of the tree trunk.

The cannonball tree is ornamental but otherwise of no importance to man, whereas some of its botanically close relatives, the Brazil-nut and monkeypot trees, the tauary tree, and Colombian mahogany serve utilitarian purposes. Brazil nuts of commerce are obtained from wild trees of the Amazonian forest. The angular seeds are contained in thick-shelled globular fruits gathered from the forest floor after they have fallen naturally from high in the leafy crown of the giant *Castanheira do Brasil* (Brazilian chestnut tree). The tauary tree is the



source of a bark cloth similar to tapa and was used by South American Indians. So-called Colombian mahogany is one of the numerous substitutes for true mahogany (*Swietenia mahoganii*).

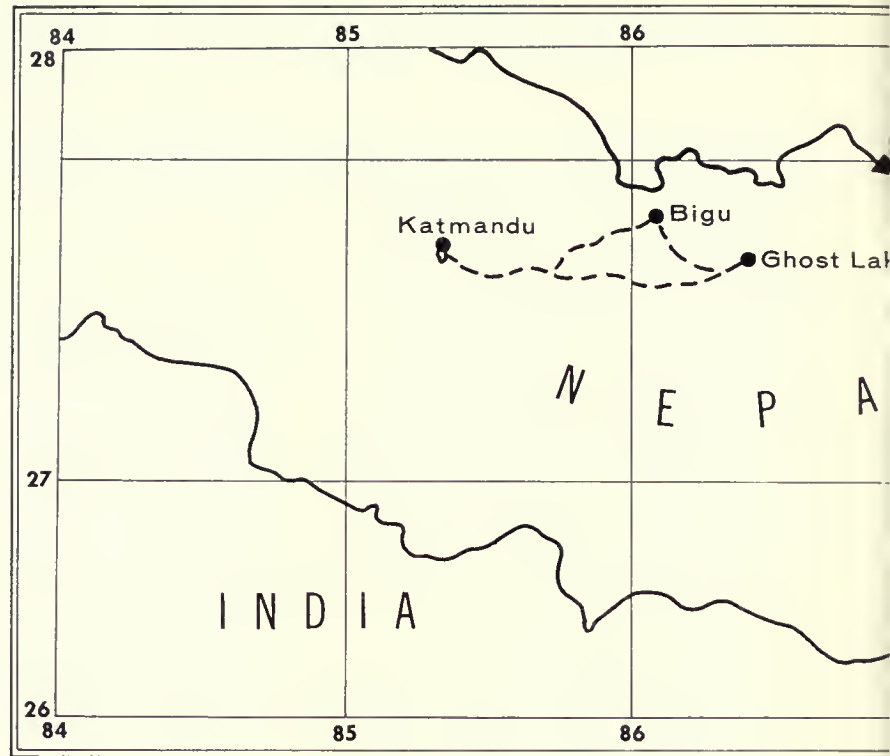
The name "monkeypot" refers to the form of the fruit, which comes in a variety of sizes and shapes, from the giant monkeypot, which looks like a scallop

squash with an opening and lid on one end, to others known as monkey's drinking cups, vases, and so forth, with stoppered openings. The name "monkeypot" may be fanciful, like Lovers' Leap, or Jacob's Ladder, or perhaps there is truth in the travelers' tales that when a monkeypot is baited with sugar a mon-

(Continued on page 7)

Dr. Robert L. Fleming
Museum Field Associate

Reports on
a 1960-61



SCIENTIFIC EXPEDITION TO THE

Initial Planning

Early in 1960, while I was in the United States,¹ Dr. Clifford C. Gregg, Director of Chicago Natural History Museum, asked me, as a member of the Museum staff living in Katmandu, whether I would represent the Museum on a forthcoming expedition to the Himalayas. The expedition was being planned by the World Book Encyclopedia and would be under the direction of Sir Edmund Hillary. My particular job would be to collect birds and small mammals for the Museum. Since my vacation was due and I would be returning to Katmandu from the United States in less than a month, I accepted.

Two weeks later I was jetting to the Orient. Plans for the World Book Encyclopedia Scientific Expedition to the Himalayas had taken definite shape. The major effort would be a study by

a group of medical men as to the effect of altitude on the human body and the scaling, without oxygen, of Makalu, the world's fourth highest mountain. A second purpose of the expedition would be to prove or disprove the existence of the "yeti." The third part of the expedition would be my work for Chicago Natural History Museum.² Chief Curator Rand outlined a rough program for me: to enlist the assistance of several Nepalese helpers for my collecting, and to choose my own time and area of operation independently of Sir Edmund Hillary's group.

Planning Our First Expedition

To make the most of our trip, it would be necessary to select men who would work well together. I therefore conducted four short trial camps near Katmandu at various altitudes to 6,000 feet. Six of us took part in these camps—two Americans and four Nepalese.

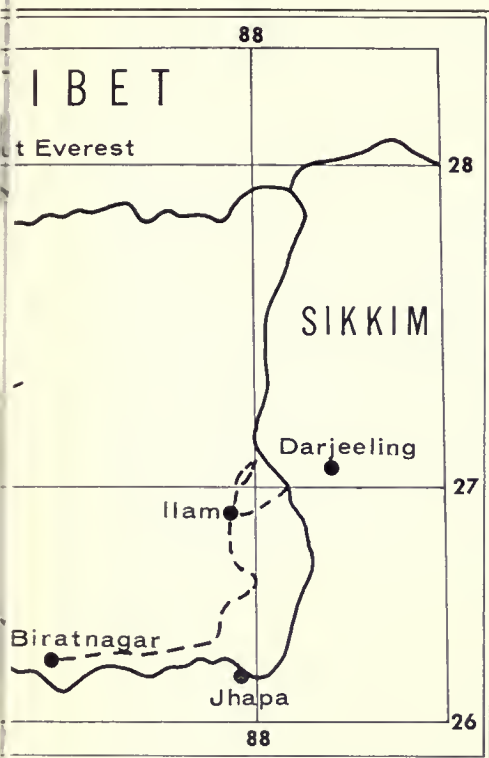
Later we added a Scottish doctor. I discovered that these men, despite their varied backgrounds, acted as a team.

One must always keep the weather factor in mind when arranging a field trip in Nepal. When we made our first trial camp in September, the weather was wet and miserable. We remained at that camp just long enough to be bitten by mosquitoes; and later two of us came down with malignant malaria—a fumbling start. We decided that we could do better work at less health risk in the bright, clear days of fall. Since November is our driest month, we fixed on that time to set out.

First, however, we had to furnish several different government departments with a complete listing of our proposed routes, fire arms, and plans in order to secure their formal permission to trek through the country. One always needs extra time when seeking such permits because there are 142 holidays a year in Katmandu. When you least expect it, you are likely to find an office closed and to be told to come back *bholi* (tomor-

¹ Dr. Fleming is representative of the Board of World Missions of the Methodist Church and Superintendent, Katmandu Area, United Mission to Nepal. Readers of the *BULLETIN* will remember his article on "The Changing Seasons in Nepal" (March, 1960).

² A grant from the World Book Encyclopedia to the Museum made possible this phase of the expedition's work.



HIMALAYAS

row). Then you had better check to see whether "tomorrow" isn't another of the 142 holidays.

Along the Everest Trail

On November 2 we began our first extended trip. Our goal was an area east of Katmandu and south of Mount Everest. After being driven by car the first eighteen miles on our way out of the city, the road tapered off and we set out on foot. Our equipment was carried by porters. Ordinary travelers cover about eight miles a day in this fashion, and this rate suited us. At night we camped by streams in the woods, and we ate the food our cook prepared from stores we carried or purchased at markets and tea houses along the way. After several days of such travel (during which two of our porters crept away during the night and had to be replaced by local men), we crossed the rim of a wide valley and there, off to the northeast, glimpsed the top of the mighty Everest. It was crowned with a snow plume that glowed with warm pink in the fading sunlight. A memorable conclusion to a day's trek

in the Himalayas!

On the following day we were up in the chilly grey dawn to cross a river on a suspension bridge that had seen better days. Beyond it, we put out our mammal traps and admired a flight of thirty or forty Kestral falcons. Over the next ridge we could see the hills running into the high country, the land of the Sherpas, but Everest was not our aim, so we soon turned off the trail toward the hills on the northeast. Here the Swiss have built several model cheese-making installations. We pitched our tent on a grassy knoll beside one of their "factories," and were invited to tea by the Swiss, sampled their cheese, inspected their wooden-shingled houses, their cow and buffalo stalls, and the kiln where they make bricks. Among all these signs of civilization we saw a score of men working on the building of an air strip where shortly before there had been only wilderness.

It was good to stop here for a bit and have time for collecting, instead of having to snatch specimens as we traveled. The children had a young civet for a pet, and the villagers brought us an adult specimen for the Museum. There were a few jackals about, and a field of millet was being devoured by rats. In a scrub jungle we found more of the birds we wanted, especially a red-headed babbling thrush and the elusive snow pigeon.

In the High Country

Later we climbed toward the Swiss milk collecting stations located at various altitudes from 11,600 to 12,600 feet. As we left the trees behind and made our way through masses of rock, we passed lovely, large orchids overhanging the cliffs along the trail. We found where the Kansu rose finch sheltered under overhanging rocks above the "Lake of Ghosts" (Bhoat Pokhari), and we saw the little mouse-hares, relatives of the Rocky Mountain pika, pop out of their burrows between the rocks when the sun warmed the chilly hillside. At these heights, white clouds stretched below us for miles toward the southwest.

In the forest fringing a ridge at 10,500 feet there were laughing thrushes, grosbeaks, and rose finches. Blood pheasants clucked from the bamboo thickets a bit

lower down. Along the base of steep cliffs at still lower altitudes lived serow and musk deer; and we also saw the holes of shrews and voles among the undergrowth. At one point we halted to watch a dozen brilliant Impeyan pheasants digging for tubers under the evergreen trees.

Bigu

Before returning to Katmandu we decided to stay a few days at Bigu. A new batch of porters led us toward the town on a much more difficult route than was necessary—after hacking our way through the jungle for nearly a day, we reached the well-trodden road we should have taken all along. We found compensation, however, in being able to buy fresh oranges off the tree for one *pice* ($\frac{1}{4}$ c) apiece.

Reaching Bigu on Thanksgiving Day, November 24th, we immediately began to explore the surrounding countryside. And here we made a real discovery—the honey guide. Although the Himalayan honey guide—a small, dull bird related to woodpeckers—is largely unknown, its African counterpart is known to be a social parasite. Some of them eat beeswax, and at least one African species guides humans to bee trees so that the men will open the wild hives and the birds can eat a share of the wax. In about the third century A.D., a Chinese scholar, Chang Hua, had ascribed similar habits to the Asiatic honey guide. Now, seventeen centuries later, I was to confirm his observations as being true, also, of the Himalayan species.

It came about this way. Near Bigu, the villagers told us that they had been collecting honey near the cliffs. As we approached the place by a narrow path winding down beside the cliffs, our bird boy, Sagar Rana, who had gone on ahead, ran back to us from the bee combs. "The men showed me where they have been scraping the wax off the rocks," reported Sagar, "and there was a bird upside down on a comb!" The honey guide at last, with its stomach crammed full of wax. That evening we celebrated our find with a complete Thanksgiving Day dinner of curried chicken, generously furnished us by the head man of the local village.

(Continued on next page)

Here, near the bee cliffs, there was an important change in the people. On the lower terraces, the villagers had been Nepalese-speaking Hindus. On these upper hillsides lived Tibetan-speaking Buddhists, each with his own neat little house fronted by a fluttering prayer flag. On one of the upper levels of the village was a well-constructed *gompa*, its central portion elaborately decorated with scenes from Buddha's life, while on either side were separate living quarters for nuns and monks.

At Bigu the medical man of our party was very busy. There was no other medical aid in the town, and almost half the population crowded around the doctor's tent wanting to be examined and to receive medicines.

Return to Katmandu

The route from Bigu back to Katmandu led over a 10,000 foot pass. With four weeks of mountain trekking behind us, we were able to cover greater distances each day. Soon we were down to an altitude of 2,700 feet and had a real bath in a warm valley stream. The next day we met Doctors West and Ward of the Hillary expedition; they and their sherpas were washing in the river when we arrived. They were away very early

next morning, carrying extremely bulky packs. "Getting acclimatized," they called it. We set off in the opposite direction and soon reached the motor road, where we intercepted a truck headed for Katmandu. We were now "acclimatized," ourselves, to hard traveling, and as we covered the last eighteen miles of our thirty-mile trip that day, we enjoyed watching a full yellow moon rise and flood the dark hills with pale light. Altogether, we had had a wonderful experience among the Himalayan hills.

Eastern Nepal

Our attention now shifted to far eastern Nepal. This is an area from which we have little data concerning birds, and from which many new records were to be expected. Our party decided, therefore, to spend part of February and most of March in the Ilam area on the Sikkim border near Darjeeling. Accordingly, six of us, along with 800 pounds of luggage, flew from Katmandu to Biratnagar, the taking-off place for our second expedition, on February 12, 1961.

Touring the Terai

From Biratnagar, we traveled for 45 miles eastward in two buffalo carts, making about nine miles a day. We passed by

cultivated fields, jolted through forests, and crossed sixteen rivers. How different from the birds of the hill country were those of the tropical terai: rails and lapwings, bitterns, herons and egrets, terns and black-necked storks of the streams and marshes were especially conspicuous. One day we found the den of an Indian fox and watched the young ones gamboling and basking. At Jhapa, a town with a fairly good bazaar but a limited supply of food for sale, we camped in the courtyard of a temple where all night long devotees rang a temple bell when they came to pray. Then we turned north to the hill country and Ilam.

One village, Santali, interested us particularly, for its people were in India before Dravidian times (4,000 B.C.) and long before the Aryans came (1,500 B.C.). Part of their fare still comes from the wild, for while skirting one reedy swamp, we met three Santal boys armed with bows and arrows and aided by five hunting dogs, each with a bell on its neck. The boys had a string of birds: a hawk, crane, water hen, kingfisher and shrike that they would have for supper.

Tiger!

A disagreement arose that evening
(Continued on next page)



What Is It?

These horn-shaped objects are known to have been fashioned from a variety of materials, such as silver, cloisonne, and tortoise shell. The ones in our photograph are of silver and are shown at about actual size. Here is a hint. Among the Chinese upper classes before the present regime, these objects were a minor, but effective, status symbol.

What are they? . . . They're fingernail guards, worn to protect the long fingernails, sometimes several inches in length, that symbolized the freedom from manual labor enjoyed by the old Chinese leisure classes. Several fine examples of fingernail protectors were photographed recently when exhibits in the hall of Chinese ethnological materials were dismantled in connection with plans now under way to reconstruct the hall completely during the coming year.

The Cannonball Tree

(Continued from page 3)



Also exhibited in Hall 29, near the cannonball tree are other members of the monkeypot family. Shown here are the fruits of some of them. The name "monkeypot" refers to the form of the fruit, which comes in a variety of sizes and shapes, many with stoppered openings.

key may stick his head in the opening, not be able to withdraw it and thus may be caught. Or, in another version, when a monkey clutches a handful of nuts in the interior of a monkeypot, he may not be able to withdraw his clenched hand, his greed being so great that he will not release the nuts even at the risk of being caught. At any rate, the "paradise nuts" produced by various species of *Lecythis* (the monkeypots) are deemed superior in flavor to Brazil nuts; but because the fruits lose their "lids" or "stoppers" while still on the tree, the seeds or "nuts" scatter over the ground and are laborious to gather, and hence scarce on the market.

A full scale reproduction of the lower trunk of a cannonball tree may be seen in Martin A. and Carrie Ryerson Hall of Plant Life (Hall 29, second floor, east), opposite the entrance to the Hall of Foreign Woods (Hall 27). Other members of the monkeypot family may be seen in Case 860 near the south end of Hall 29.

(Continued from preceding page)

when I proposed camping in a forest clearing. Our cartmen strongly disagreed—tigers might attack and kill their buffaloes! But camp we did, despite panther and tiger tracks in the sand. As the camp went up, the men scurried around to find wood and in a few minutes had assembled the impressive amount of fuel needed to keep a fire going all night. Perhaps it was just as well, for the monkeys woke us with alarm calls at midnight, and we heard a panther begin its deep-throated "wood sawing" calls at minute-and-a-half intervals. At that moment, the walls of the tent seemed awfully thin! The next morning, a man from a nearby village reported that one of his goats had been killed and eaten during the night, and that the carcass of one of his pigs was hanging from a fork in a forest tree. Probably buffalo meat was too tough for the panther, which was fortunate for us!

In a few days we left our cartmen and hired porters and horses for the journey farther north. Quickly we left the plains behind and started a gentle climb. There were small streams and thick, tropical forests full of bamboo, tangled vines, and tall trees. As we approached Ilam, we re-

called that much of the country nearby used to be covered with pines, but not a single pine now remains. Well built homesteads, cultivated fields, and extensive terraces of tea bushes now are the rule here. The country is one of the most advanced in Nepal. Every mile or so one finds a village or town.

A Forest Camp

We continued to climb rolling hills, each one higher than the one preceding. After being entertained with tea and a radio program by the leading Brahman of one town, a guide was furnished to take us to a suitable camping place in the forest. Here we stayed eight days. The ravines were filled with clouds at times; cliffs towered overhead. To the south, the slopes were dry and grassy. On the northern slopes, however, much of the forest remained and the ground was covered with moss and ferns. Large sprays of yellow-green orchids hung from the trees above our camp and water rushed loudly below us. Small birds were plentiful, but one of the most important specimens—the *Myzornis*, a bright green, sparrow-sized bird with a slender bill and a brush tongue—eluded us. We finally found what seemed to be a

Myzornis drinking sap from a large oak tree, and bagged the specimen for further study at the Museum.

The Lowlands and Home

After adding many more birds to our collection—thrushes, babblers, minivets, fulvettes, sunbirds, brush robins, dippers and fork-tails from the streams, red-starts, wren babblers, flowerpeckers, and others—we descended again to the lowlands. There it felt and smelled like a hothouse in comparison with our forest camp. We stayed overnight in a tropical mango grove.

A quick trip to Darjeeling by Land Rover, a beautiful view of Kinchenjunga, and we began the trip back by car. Changing eventually to a little Nepalese train, we reached Simra, where we missed the plane and had to camp in the airdrome all night. The next morning, twenty minutes' flying time brought us home to Katmandu on March 23, 1961. Our expedition arrived just in time for me to be home to celebrate our 25th wedding anniversary!

(As a result of Dr. Fleming's collecting activities in the Himalayas, he has sent the Museum some 382 bird and 150 mammal specimens, including some rarities and new records for the country.)



Above photograph and cover by Division of Photography

MUSEUM EDUCATION REACHES OUT TO THE BLIND

Joanne Evenson
Staff Member, Raymond Foundation

"IT FEELS SO shiny"—was the comment, as the boy's hands slipped over the surface of the calcite crystal. Quickly but thoroughly he "saw" in detail first the crystal and then a piece of graphite, which he described as "slippery."

Though the descriptions were unusual, they were easily understood by six of the youngster's classmates, who, like the boy, were blind. Part of a 28-student group studying rocks and minerals in a workshop conducted by the Raymond Foundation, the seven children were the first sightless students to take part in a Museum workshop program.

They were participating in the program with their 21 sighted classmates in the hope that they would get more from the experience while in the company of their friends. Few modifications in the usual workshop were necessary for these unusual students. The normal schedule—a color film on rocks and minerals, time spent in the "laboratory" for the testing and the identification of mineral specimens, and question sheets answered after studying the Museum's geology exhibits—was followed. However, the questions for the blind children had been prepared in advance in Braille by their teacher, and the minerals were es-

pecially chosen for their definite or unusual texture rather than their color.

Results were quickly seen. One boy, after handling a geode, described the quartz crystal-lined stone as "rough on the outside but rough and beautiful on the inside," an extremely accurate description from one who could "see" only with his fingers. With their question sheets, the blind students were given styli with which they could imprint their answers in Braille on the special, heavy paper provided them. Sighted classmates helped them to find the answers in the exhibit cases.

At the conclusion of the one-and-a-half-hour session, observers felt that the blind children had learned as much as the sighted. Among the comments made by the Braille participants was one from Robert Weiland, who was especially interested in seeing the meteorite because "he couldn't believe that a rock could be that big."



CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

Vol. 33 No. 3
March 1962

Nature Photography— This Month's Cover

Winners of silver medals in the Chicago International Exhibition of Nature Photography, displayed last month in the Museum, represent states from the East to the West coasts, and include a resident of the Chicago area.

In the "Print" category, silver medals were awarded to: John Kohout, La Grange Park, Illinois; Fred E. Unverhau, Danbury, Connecticut; and Charles L. Norton, Topfield, Massachusetts. (Two prize-winning photographs are reproduced on this page.) In the "Slide" category, medals went to: Gertrude Russ, Glendale, California; Agnes M. Holst, Phoenix, Arizona; and Beatrice



Nature Photo Winner by Charles L. Norton

Petersen, Niagara Falls, New York. The BULLETIN cover, entitled "Guarding the Nest," is by Grant M. Haist of Rochester, New York.

Children's Programs

Children will have an opportunity to step back into ancient Mexico and to compare it with Mexico as it is today when the Museum's new Journey for spring begins on March 1.

"Journey to Mexico" starts at a miniature view of the great market in Mexico City in the year 1515, five years

before the coming of Cortez. From that embarkation point the journeyer travels to such fascinating exhibits as the Temple of Quetzalcoatl, in which the feathered serpent god was worshipped, and on to displays showing the modern Aztec, Tarascan, and Zapotec Indians. Information sheets and questionnaires are available at the Information Desk and at the North and South doors of the Museum. All children who can read and write are eligible, and the Journey will be in effect during March, April, and May.

As an introduction to the new Journey, and the beginning of the Museum's spring series of free programs for children, the color motion picture, "Journey to Mexico," will be presented on March 3 at 10:00 A.M. in James Simpson Theatre. During March and April free programs for children will be held every Saturday morning at this time. Following is the complete schedule:

March 3—Journey to Mexico

(Cartoon also)

March 10—The Red Balloon

(A Parisian boy's friendship with a red balloon)

March 17—The Magic Thread

GIRL SCOUT DAY (Movie, slide story, and stage show)



Nature Photo Winner by John Kohout

Chicago Natural History Museum

Founded by Marshall Field, 1893

Roosevelt Road and Lake Shore Drive, Chicago 5

Telephone: WAbash 2-9410

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March 24—Islands of the World

CUB SCOUT DAY

March 31—Our New Frontiers

CAMP FIRE GIRL DAY (Movie and stage show on Alaska and Hawaii)

April 7—Congo Safari

MUSEUM TRAVELER DAY (Dr. Robert F. Inger of the Museum staff tells the story of his recent expedition to the Congo)

April 14—Japan Harvests the Sea

(A Disney "People and Places" movie—cartoon also)

April 21—NO PROGRAM (Easter Saturday)

April 28—A Night Out with Mr. Toad

(And other films on the world of nature—cartoon also)

(Continued on page 8)

MARCH EXHIBITS

Indians of the Overland Trail

PAINTINGS OF PLAINS INDIANS BY PAUL DYCK

AND

The Pawnee Thunder Ceremony

A MINIATURE DIORAMA

*"The clouds shall touch the earth
And the earth shall receive power from above."*

PAWNEE CHANT

WHEN the first sound of spring thunder was heard by the Pawnee Indians who occupied the dry, sandy slopes of the Platte River valley before the coming of the white men, the sound signified that the gods were ready to turn their attention earthward and to receive once again the prayers and offerings that opened the religious ceremonial year.

The voice heard in the thunder was that of the god, Paruxti, messenger of the supreme deity, Tirawa. As Paruxti passed over the land in the first spring storm, his voice awakened the earth and kindled life anew. Hearing this message, the priests assembled their sacred bundles and began a ritual of chants and sacrifices that symbolized and ensured the renewed concern of the gods for the welfare of men.

It is this event that is portrayed in the Museum's featured exhibit for March—a miniature diorama, displayed in Stanley Field Hall, of the Pawnee thunder ceremony. Concerning it, the noted anthropologist, Ralph Linton, has written in a Museum publication: "The thunder ceremony was, more than any other, at the bottom of [Pawnee] ceremonial life. . . . It promoted the well-being of the tribe, and was efficacious in driving back the malignant being of the southwest, the bringer of disease. It instructed the people as to their duties and privileges in their relationship to the deities; and finally it afforded many opportuni-

ties for direct communication with the deities themselves in a number of rites of sacrifice . . ." Linton's detailed description of this interesting ritual of early spring is available at the Book Shop for fifty cents.

Also on exhibit during March is an exciting gallery of Indian portraits painted by Arizona artist Paul Dyck, delineating "Indians of the Overland Trail." These brilliant, almost lifesize paintings of plains Indians in full ceremonial dress depict representatives of the Nez Percé, Sioux, Blackfeet, Cheyenne, Crow, and Shoshoni at the zenith of their tribal existence.

Dyck has lived among a number of Indian peoples, having received from the Sioux a particularly appropriate name meaning "Rainbow Hand." He imparts to his paintings, which he calls "a labor of love," the qualities of accurate observation, compassion for the American Indian, and an impressive command of historical background. In the illustrated catalogue that accompanies the exhibit, Dyck writes of his work: "The Indian recreated in these paintings is the free man of the buckskin, porcupine quill, bow and arrow days; a primitive man but one rich in his way of life . . ." The Museum is pleased to bring this special exhibit to Chicago following its recent successful showing in the Phoenix Art Museum.

P. R. NELSON



Shoshoni "Digger" Warrior: *Painting by Paul Dyck. In Western Idaho and Nevada, a barren country empty of large game, lived the poorer bands of the Shoshoni Indians, commonly called "Diggers" by the whites. They did not own horses, and lived in primitive houses that were mostly mere brush shelters. Their fare was rabbits, small birds, roots, nuts, seeds, and in bad years often only the desert insects. Rarely using moccasins or garments, their artistic development was limited to a few work utensils. That the "Diggers" survived on their inhospitable land speaks well of them as a people.*



Osaka Castle. From "Fabulous Japan."

Presenting
the 117th series of

Adult Travel Lectures

March 3 through April 28, 1962

March 3—Laos, Focus of Conflict

Arthur Niehoff

As village development adviser in Laos for the International Cooperation Administration during 1959–61, Arthur Niehoff lived through the events that have made Laos front-page news during the past two years. An anthropologist and Asian specialist, Niehoff learned to speak both Lao and French for his assignment and thereby came to know the Lao people well. He is unusually qualified to present an intimate picture of the people and their country. In his authentic film documentary, Niehoff has captured both the old and the new—the quiet isolated country of yesterday, almost unknown to Americans two years ago, and the rapidly changing Laos of today, focal point of the current struggle for world power.

March 10—Germany

Gordon Palmquist

Germany, though in the forefront of the news, is still an unfamiliar country whose problems are not well understood by many who have not been there. In an attempt to shed light on contemporary Germany, Gordon Palmquist presents the intensely human story of its people divided between East and West. In his program he contrasts May Day scenes of soldiers and tanks in Russian controlled East Berlin with a romantic children's procession at Dinkelsbuhl, the gay life of Munich at festival time, and the rich cultural life of rebuilt West Berlin. Add to this a Rhine journey at grape harvest time and visits to the world famous Hanover Industrial Fair, the Volkswagen factory, and Mad Ludwig's Castle—and you have a refreshing documentary.

March 17—Mormon Land Highlights

Alfred M. Bailey

All the magnificent features of our country's great West, which have kindled a desire for adventure and beauty in Americans from frontier days to the present, are dramatically presented in this outstanding film on Utah. Through the years, Alfred M. Bailey, Director of the Denver Museum of Natural History, has photographed the changing seasons of this western state, from the deep canyons on its southern borders to the rugged mountain tops toward the north. Among the highlights of his film adventure are sequences devoted to Bryce and Zion National Parks, Arches National Monument, the Natural Bridges to Mexican Hat, and a six-day journey down the rapids of the San Juan into the Colorado River.

March 24—The "Yankee" Sails Across Europe

Captain Irving Johnson

A boat that does almost everything but fly was the vehicle employed by Captain and Mrs. Irving Johnson to explore a Europe unknown to most travelers. On this trip, the Johnsons' goal was to seek out the romantic and out-of-the-way places of Holland, Belgium, Germany, France, Italy, and Greece. The Johnsons' boat, a ketch called "Yankee," crossed oceans, negotiated tunnels, harbored on remote beaches, and folded her sails to dodge under bridges. To broaden still further the scope of their picture-taking, the Johnsons carried two motor scooters on deck, which they put ashore from time to time over a specially built aluminum gangplank. These the two sailors used for touring Europe's rolling countryside.

March 31—Tangier to Istanbul

Clifford J. Kamen

The Strait of Gibraltar, the Suez, and the Dardanelles are three gateways that have exerted a powerful influence on Mediterranean lands since ancient times. "Tangier to Istanbul" is a story of those three vital waterways. Whether it be the mysterious Casbah, the ancient fortifications of Gibraltar, the blue grotto of Capri, or the famed cedars of Lebanon, Clifford Kamen has the ability to present the familiar from an unconventional point of view. His film is especially noteworthy for its extensive photographic coverage of crucial military areas where photography is generally forbidden. Concluding the program is a stop at Istanbul, the world's only city that straddles two continents, where the historic Basilica of St. Sophia, the Blue Mosque, and the most massive city walls ever built in ancient times still stand.

unique covered coaches, while 70-foot lions guard the entrances to its fabled temples. William Moore has made Mandalay the last stop in an enticing film trip that includes Singapore, gateway port between East and West; Bangkok, whose Royal Palace is familiar to lovers of "Anna and the King of Siam"; and Rangoon, home of the Reclining Buddha, the largest image of the Honored One in the world.

April 14—Fabulous Japan

Willis Butler

Japan's phenomenal industrial recovery and growth following the war has created a country that blends the cultures of East and West. Motorbike rickshaws, 700-year-old plays, television towers and skyscrapers, exotic temples and shrines—all are intermingled to create a new milieu. Willis Butler shows in his program that as typical now of

April 21—Poland

Kenneth Richter

Biscopin, a reconstructed prehistoric lake village; Poznan, Poland's first capital; Gdansk, the ancient Hanseatic port town; glowering Marlboro, greatest of the Teutonic castles; Krakow, beautiful, undamaged, a gem of the Renaissance; Warsaw, "the Paris of the North"—these are the places that form the backdrop for Kenneth Richter's delightful film story about the Polish people. You will meet a steel worker in the new Soviet-equipped steel complex of Nova Huta; a young woman who works among the antiquities of a museum in Krakow by day and at night joins her friends at a Jazz Club that meets in a 16th Century cellar; a University of Warsaw student of atomic science; and finally, a farm family living in the magnificent Tatra Mountains near Zakopane, who each Sunday don brightly colored peasant costumes to attend church in the little village of Bukovina.

April 28—An Ozark Anthology

Leonard Hall

Possum Trot Farm in the legendary Ozarks, an area abounding in wildlife of all varieties, has afforded Leonard Hall with many opportunities to observe nature. It is on this farm that much of his "Ozark Anthology" was filmed. In this color motion picture of a picturesque and seldom portrayed region, Hall unfolds the story of the Ozark hills. On the soil of one of the oldest land areas on our continent live the woodland creatures that play leading parts in Hall's film—raccoon and opossum, chipmunk, flying squirrel, and whitetail deer. Great blue herons are shown patrolling the rivers, while green herons stalk the spring peepers at the water's edge. And in the air the great horned owl and the osprey soar on tireless wings. There is a human side to this story, as well, in glimpses of the mountain people who have made their homes in the deep hollows of the Ozarks.

All programs begin at 2:30 P.M. in James Simpson Theatre. Reserved seats will be held for Museum Members until 2:25 P.M.



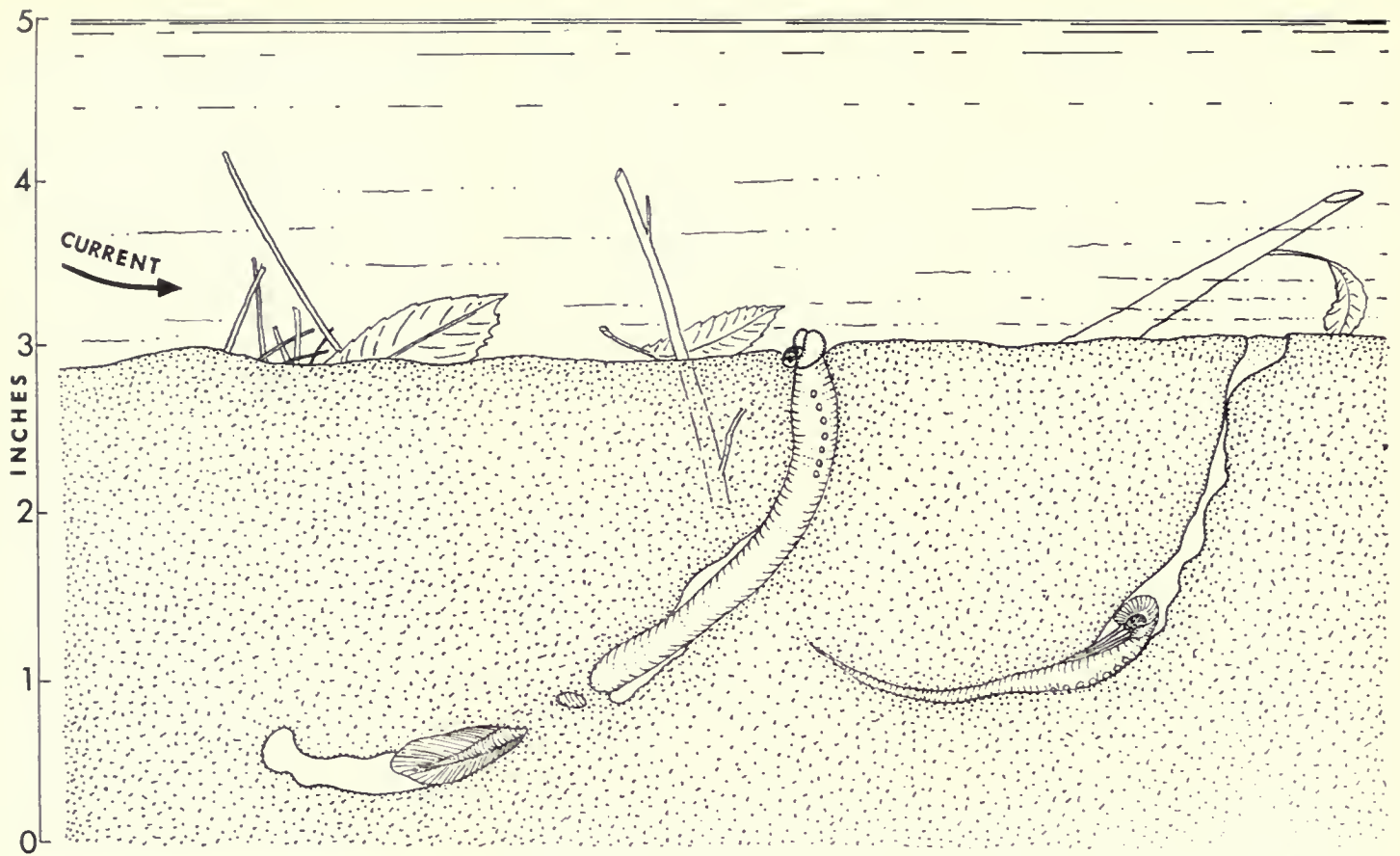
Marlboro Castle, seat of the Teutonic Knights. From "Poland."

April 7—The Road to Mandalay

William Moore

In the heart of Burma, within the shadow of Mandalay Hill, lies the mystic and far-off city made famous by Rudyard Kipling. Mandalay, formerly the home of Burma's last kings, today is a mecca for yellow-robed Buddhists, Indian fakirs, beggars, and snakecharmers. Along its busy streets rumble oxcarts, rickety two-wheeled carriages, and

Japan as rice paddies and temples have been in the past is the mushrooming of new industries, such as the manufacture of transistor radios, cameras, and other electronic equipment. At the same time, no film of Japan would be complete without the traditional attractions that have captured the hearts of visitors for centuries—Mt. Fuji, the world-famous gardens of Kyoto, the Kabuki Theatre, Tadaiji Temple, and the "Floating Shrine" of Itsukushima.



Sea lamprey larvae shown in their burrows in mud of lake bottom (re-drawn from Applegate).

SEA LAMPREY EXHIBIT

Shows Different Feeding Structures of Larvae and Adults

LOREN P. WOODS
Curator of Fishes



Figure 1: Mouth of adult sea lamprey.



Figure 2: Head of larval sea lamprey.

RECENTLY the Museum placed on exhibit in the Hall of Fishes (Hall O, ground floor, west) enlarged models of the mouth of both the larval and the adult forms of the sea lamprey.

These models show the great differences in feeding structures between the immature and the mature lamprey. The adults possess the horny teeth and rasping tongue that enable them to cling to other fishes and suck their blood (Figure 1). But the sea lamprey is a parasitic menace to other fishes only during its relatively short adult life. For the

first four to eight years (nobody knows just how many) of its existence, it is a blind and harmless larva, called an ammocoete, which lives in a burrow in the soft mud of quiet pools and eddies, and in the main body of lakes just off the mouths of streams. These ammocoetes possess a dendritic structure (Figure 2) that acts as a filter in separating microscopic food organisms from the surrounding water.

Shortly after hatching, the tiny, transparent ammocoetes work their way up through the gravel of their nest, where they are caught in the current and carried downstream. As soon as the current slackens they dive for the bottom, burrowing into the soft, oozy mud that is usually found there. Here they stay, unless washed out by eroding floods that sometimes carry them along with their cover further downstream or out into the main body of the Great Lakes.

At intervals the larvae come to the entrance of their burrows and feed on the microorganisms that are especially abundant in the thin layers of debris lying on the lake bottom. Dr. V. C. Applegate of the U. S. Fish and Wildlife Service has described this behavior in detail:

"When ready to feed, the ammocoete squirms upward in its burrow until the oral hood is at or near the surface of the bottom. Here it may lie for long periods of time, the branchial area expanding and contracting as water is pumped in and out for respiratory and feeding purposes. . . . Pumping action into the oral hood is easily discernible by following bits of detritus suspended near the bottom as they are drawn into the hood. Microscopic organisms are drawn into the hood on the water currents. At least some of these organisms are separated out from the detritus by the sieve apparatus and passed to the intestine for digestion. Periodically the detritus accumulated on the sieve is blown out. The larva is seen to expand its branchial region, the gill openings close, and with a rapid convulsive movement of that region and the head, a cloud of small particles is ejected from the hood. Typical pumping is resumed at once . . . At irregular intervals, the ammocoetes retreat to the depths of their burrows for varying periods."

Rare Lizard Reaches Museum

ROBERT F. INGER

Curator of Amphibians and Reptiles

Several weeks ago the Division of Amphibians and Reptiles received a highly publicized lizard from Mr. Tom Harrison, Curator of the Sarawak Museum in Borneo. This lizard, called "Jorgen" by Mrs. Harrison but *Lanthonotus borneensis* by herpetologists, is a member of a species about which we know very little.

Brown without a conspicuous pattern, about thirteen inches long, short legs, small eyes, flattened head, long tail—nothing about this lizard is especially striking except to a herpetologist. Scientific interest attaches to *Lanthonotus*—the

the ground in the rain forests covering Borneo? These are the simplest questions to ask about an animal, yet we had no answers.

Now, however, the Harrisons have supplied at least partial answers. Our specimen was found about ten inches below the surface in soil of formerly cultivated land. The Harrisons kept the lizard alive for several months and after trying all sorts of food, induced it to eat the eggs of the green sea turtle, something *Lanthonotus* never encounters in nature. "Jorgen" could swim well and



earless monitor—because it is the least known member of the group of lizards from which snakes arose. If we are to understand the origin of snakes, we must first know their ancestors.

The mere half dozen or so specimens that reached museums between 1878 (when *Lanthonotus* was first discovered) and 1961 were sent by men who obtained the lizards from natives and were not interested in the biology of *Lanthonotus*. All we knew until this year was that the animal lived in Sarawak on the northwest coast of Borneo. Did it live in water? Did it burrow in the soil? Or was it one of those many lizards that live on

would stay submerged for long periods in a wash basin, though the lizard was found a hundred yards from water.

Two more specimens of *Lanthonotus* have been caught in the last two months. It has always been this way—an animal is rare until we know where and how to look for it. As more individuals are found, it will be possible to make more observations on their behavior and to study their anatomy more thoroughly. Whether these studies will actually help us unravel the ancestry of snakes cannot be foretold. At the very least we should have a better understanding of the evolution of lizards.

MUSEUM NEWS

(Continued from page 2)

Free Concerts

George London, bass, will appear in recital at Free Concerts Foundation's April 3 (Tuesday) concert at 8:15 P.M. in the Museum's James Simpson Theatre. He will be accompanied by Leo Taubman, pianist, in a program that will include works by Handel, Schubert, and Moussorgsky.

Also to be presented by the Foundation during April will be a violin recital on Wednesday the 18th by Sidney Harth, concert master of the Chicago Symphony Orchestra. Harth will play the sonata recital he performed during his 1961 Russian concert tour. His piano accompanist will be Christiane Verzieux.

For free tickets to both events send a stamped, self-addressed envelope to Free Concerts, Chicago Natural History Museum, Roosevelt Road at Lake Shore Drive, Chicago 5, Illinois.

A lecture on "What Is a Chamber Orchestra" and a concert for wind instruments will be the March 4 and 18 (Sundays) free programs of the Chicago Chamber Orchestra Association, each to be held at 3:30 P.M. in James Simpson Theatre.

Exhibition Held Over

"Winter Fur 'N Feathers," the temporary exhibit announced in the December BULLETIN, has been so popular with the public and with school groups that it is to remain on exhibition during the spring and summer. While originally announced as a winter exhibit, and combined with the winter Museum Journey of the Raymond Foundation, the exhibit actually covers both summer and winter aspects of bird and mammal coats.

Staff Changes

Mr. James I. Goodrick joined the staff on February 1 as Assistant to the Director. After Army service in World War II, Mr. Goodrick spent 17 years in the field of industrial administration. His most recent affiliation has been with Wyatt & Morse, Management Consultants.

Dr. John W. Thieret, Curator of Economic Botany, resigned on February 28 to enter the teaching profession. Dr. Thieret joined the staff of the Museum in October, 1953. Earlier that year he had accompanied the late Dr. Bror Dahlgren on a field trip to Cuba in connection with the study of palms of the genus *Copernicia*. In January, 1954, he became Curator of Economic Botany at the Museum. He conducted field trips

to the Great Plains of the United States and Canada in 1958, 1959, and 1961. Dr. Thieret will be associated with the University of Southwestern Louisiana.

University Cooperation

Six curators from the Department of Zoology and two from the Department of Geology will present a new course entitled "Zoogeography, Phylogeny, and Evolution" for the University of Chicago during the winter quarter (January-March). The course is designed for seniors and graduate students in the University's Department of Zoology, and will introduce them to the range of research problems that occupy museum staff, and acquaint the students with the kinds of biological information that can be extracted from museum specimens.

Curators participating in the course are: from the Department of Zoology—D. Dwight Davis, Curator of Vertebrate Anatomy; Henry S. Dybas, Associate Curator of Insects; Philip Hershkovitz, Research Curator of Mammals; Robert F. Inger, Curator of Amphibians and Reptiles; Austin L. Rand, Chief Curator of Zoology; Rupert L. Wenzel, Curator of Insects; and Loren P. Woods, Curator of Fishes. Also, Rainer Zangerl, Curator of Fossil Reptiles, and William Turnbull, Assistant Curator of Fossil Mammals, from the Department of Geology.

WHAT IS IT?

Objects like the one shown are often brought to the Museum by their collectors, who usually mistake them for fossils. Actually the photograph is of a concretion, a name given by geologists to the concentric structures that result in nature by the precipitation of some soluble mineral about a nucleus. Concretions occur in sedimentary rocks, commonly along bedding planes.

The mineral constituents of concretions consist chiefly of the cementing material of the rocks in which they are enclosed. The most common cementing minerals are silica, calcite, and iron oxide. These are carried in solution by percolating waters from the surrounding rock and redeposited around a nucleus, which may be a mineral grain, a leaf, or a fossil. Concretions range in size from a fraction of an inch to many feet in diameter, and are remarkably diversified in form—spheroidal, oval, disk-shaped, or fantastically odd and irregular, the latter resulting from the fusion of two or more simple forms or by deposition around an irregular object. To the imaginative finder, these structures may very well resemble familiar animal or artistic forms.

Concretions in many fascinating shapes are displayed in Hall 34 (at Soundtrek station 10) and at the east end of Hall 37, where fossil-like formations are distinguished from true fossils.



CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

Tibouchina granulosa: "Flower of Lent"



VOLUME 33
NUMBER 4
APRIL 1962

SEE the human image with fresh insight through the eyes of primitive artists; compare the anatomy of your heart with the hearts of other mammals; discover what would happen to Earth plants transported to Mars; and learn how to brew a proper cup of tea—all at Chicago Natural History Museum's once-a-year, behind-the-scenes event—Members' Night!

On April 27, from 7 to 10 P.M., the entire staff of the Museum will play host to Members in the offices, laboratories, studios, and workrooms not ordinarily open to the public. In addition to special exhibits, lectures, and demonstrations, the curatorial staff will discuss their research-in-progress.

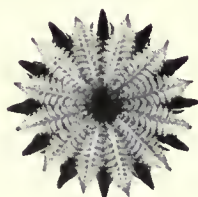
Following is a partial schedule of the evening's events:

In the Department of Anthropology



"The Human Image in Primitive Art," a new exhibit opening on May 1, will be previewed by Members in one of the world's largest permanent exhibition halls devoted to primitive art (*Hall 2, first floor*). Curator Phillip Lewis will lecture on the exhibit in Hall 9. *On the third floor*: a special exhibit of objects to be found on a Chinese scholar's desk. Also, lecture demonstrations on (1) how to look up a word in a Chinese dictionary, and (2) tea—the varieties; how they are grown and processed; and the proper art of brewing.

In the Department of Botany



"The Guatemalan Highlands," illustrated talk by Curator Louis O. Williams (*Hall 9, first floor*). A new exhibit hall of economic botany, in progress (*Hall 28, second floor*). *On the third floor*: What happens to growing plants when they are subjected to the conditions presumed to exist on Mars. And, the "next-of-kin" variation in plants.

Page 2 April



An invitation to . . .

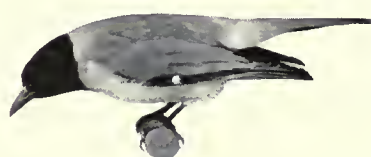
Members' Night!

. . . April 27, 1962

In the Department of Geology

On the third floor: Demonstration of stereoscopic X-ray techniques used in studying fossil fish from Indiana that inhabited an epicontinental sea 250 million years ago (see photograph above). Devonian fish and Eocene mammals collected on Museum expeditions to the Bighorn Mountains and to western Colorado. Sectioned and polished rock specimens showing cone-in-cone structure. Concretions and pseudo-meteorites—natural formations that fool the unwary collector. *On the second floor*: The reinstalled Hall of Gems and Jewels (*Hall 12*) displays recent acquisitions and a bright, new look.

In the Department of Zoology



On the third floor: Birds and mammals collected on recent Museum expeditions

to Northern Rhodesia and Suriname (Dutch Guiana). A range of heart specimens comparing the human heart with those of other mammals from huge bears to tiny mice. The jewel-like colors of the insect world. *On the fourth floor*: Pearl-producing mollusks. Displays of furs and skins from rare and exotic animals. *On the ground floor*: An array of fish skeletons illustrating the framework that holds a fish together. Reptiles and amphibians with bizarre forms.

The public exhibition halls, the Book Shop, and the cafeteria open at 6, with dinner being served (at usual prices) until 8. An adjacent room will be available for those who bring picnic hampers from home. Tea will be served in the third floor Library, and other refreshments in Stanley Field Hall. Soundtrek tours are available, and nature films will be shown throughout the evening in the second floor Meeting Room. At frequent intervals chartered buses will provide transportation to and from State Street and Jackson Boulevard.

SURINAME ZOOLOGICAL EXPEDITION

Philip HersHKovitz, Research Curator, Mammals

Illustrations by E. John Pfiffner, Museum Artist

The Museum's collection of Suriname mammals and mammalian ectoparasites is now the largest and most varied in the world.

plane service can speed him in a few hours to high forests, isolated savannas, and table-topped mountains in the most remote and undisturbed corners of the country.

Suriname is part of a natural biological area known as the Guianan region. This is a vast wilderness territory which extends from the Orinoco River in Venezuela east to the Atlantic and south to the Negro and lower Amazonas Rivers in Brazil. The mammals of British Guiana and some of the highlands of the interior of Venezuela are fairly well known. Those of the remainder of the Guianan region are hardly known. Least documented are those of Suriname. Less than half the number of mammalian species presumed to occur there have actually been recorded in scientific literature. Small rodents, which make up the bulk of the mammalian fauna, had been nearly entirely passed over in field collecting and in published records. The habits and distribution of Suriname mammals had hardly been studied and, prior to our work, only a negligible number of specimens had been preserved in American institutions.

Review of Suriname Mammalogy

Suriname mammalogy begins in 1719, with, strange as it may seem, the posthumous publication in Holland of a book on insects by a Dutch artist and amateur naturalist, Maria Sibylla Merian. Madame Merian arrived in Suriname in 1699 to sketch and paint its beautiful butterflies and strange insects. By way of filling up the lower half of the last plate of her book, she drew what she described as "a kind of wood-rat which always carries her young (of which there are commonly five or six), on her back." She went on to say that "when these rats come out of their hole, either to play or seek their food, they run about with their mother, but when they are sated or sense the presence of danger,

(Continued on page 7)



Suriname and the author's collecting localities: (1) Paramaribo, (2) Lelydorpplan, (3) Carolinakreek, (4) Loksie Hatti, (5) La Poule, (6) Dirkshoop. Inset: Position of Suriname in the Guianan region (bars) and South America.

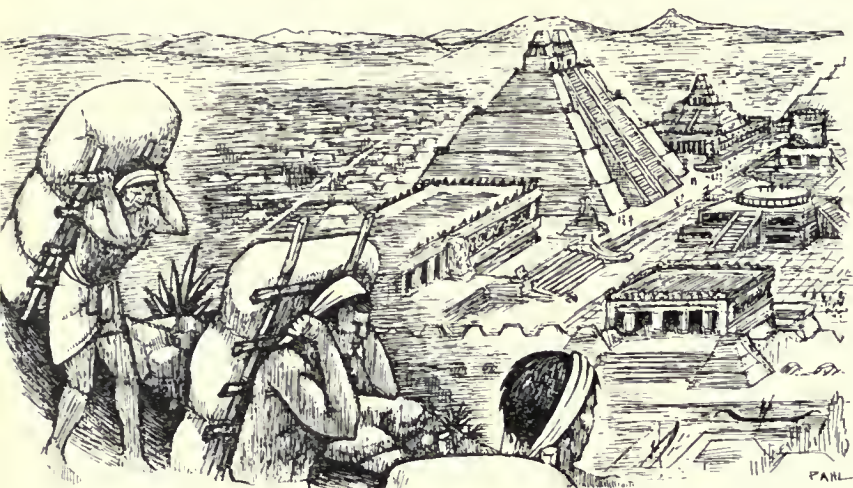
SURINAME is a little country on the northern coast of South America. It has about the same land area as Illinois, is almost entirely covered with tropical rain forest, and is exceedingly rich in bauxite. Formerly known as the colony of Dutch Guiana, Suriname is bounded on the west by British Guiana, on the east by French Guiana, and on the south by Brazil.

Its people are a conglomeration of Amerindians, Africans, Asiatics, and

Europeans. Nearly half its quarter million inhabitants live in the capital city, Paramaribo, and most of the others farm or raise cattle along the fertile coastal strip. This leaves all but a small fraction of land in the possession of a meager population of primitive Indians, Bush Negroes, and wild animals.

A naturalist can begin his studies of wild animals in the outskirts of Paramaribo itself. Thence, good roads, navigable rivers, and regular grasshopper

TRIBUTE BEARERS OF ANCIENT MEXICO: "For weeks the people of Tepoztlan have been preparing tribute for the Aztec conquerors . . . The carriers are loaded and start on the march to the capital."



MEXICO: LIFE IN A MEXICAN TOWN

Chapter highlights from the new Raymond Foundation publication for children written by Edith Fleming and illustrated by Marion Pahl

A different chapter will be presented each week to children attending the Saturday morning programs at the Museum this spring

JOURNEY TO MEXICO, the spring journey for children, also follows the Mexican theme



THE FAMILY FARM: "Last January Papa . . . started to clear a new field. First he cut down the trees. Then with a machete he cut down the bushes and shrubs. All the work has to be done by hand, chopping away at the soil with a hoe."



MARKET DAY: "... Noise and bargaining and laughter and strange delicious smells."

THE CONQUEST OF MEXICO: "When Cortez and his conquistadores reached Tenochtitlan, the capital, Montezuma received them kindly..."



SCHOOL DAYS: "Most of the children in the town start school, but many drop out each year until by sixth grade there are few left.

Maria, Pablo's older sister, was very sad when she had to stop school and stay at home. She cried a great deal. But Pablo couldn't understand."



A MEXICAN BOY: "Pablo's home, like his neighbor's, is made of sun-dried bricks and roofed with tile. The door of the one-room house opens into a walled yard where there is a row of cans filled with bright flowers."

THE FIESTA: "The dancers from Jalatlaco have made a vow to dance at the fiesta this year. Their leaders carry statues of the santo and bright-colored banners with the name of their club.... They look very fine, both the men and women, with their plumed headdresses and their pink and red costumes embroidered with beads. A procession winds down the street: women with baskets of flowers and incense, men with great candles to be burned in the church, musicians with flutes, and a drummer to bring up the rear. 'The firecracker tower is coming,' shouts Pablo...."



This Month's Cover

The Lenten season comes to Brazil in fall. Through much of the country the heavy rainy season is past and many trees and shrubs begin to come into flower. The subject of our cover, *Tibouchina granulosa*, is one of the most colorful of trees and is to be found, often abundantly, from Pará and Baía in the northeast of Brazil down through the coastal ranges and hills to Rio de Janeiro and São Paulo and westward to Bolivia.

There are many fancy Tibouchinas in Brazil. If they come into bloom during the Lenten season the common names *quaresma*, *flor de quaresma*, or *quaresmeira* are often used for them. These names may be translated as *Lent*, *flower of Lent*, or *tree of Lent*. It is common practice in Latin America to name a showy or attractive plant for a religious holiday during which it is usually in bloom.

The Tibouchina shown on the cover is a model constructed of hand-blown glass, wax, and a variety of plastics. It is one of the Stanley Field Collection of Plant Models displayed in Hall 29. The photograph is by the Museum's Division of Photography.

April Concert

Free Concerts Foundation brings George London, baritone, to the stage of the James Simpson Theatre on Tuesday, April 3, at 8:15 P.M., in a recital of works by Handel, Schubert, Brahms, and Moussorgsky.

Sidney Harth, violinist and concertmaster of the Chicago Symphony Orchestra, will be the soloist at the Foundation's free concert on Wednesday, April 18. Harth will perform the sonata recital he played during his 1961 concert tour of the Soviet Union.

Free tickets for both concerts may be obtained by sending a stamped, self-addressed envelope to: Free Concerts, Chicago Natural History Museum, Roosevelt Road at Lake Shore Drive.

Staff Lecture

Dr. Robert F. Inger, Curator of Amphibians and Reptiles, recently presented two lectures to the Department of Biology at San Diego State College, California. During his study trip to the Coast, Dr. Inger also conducted a biology seminar at the University of Southern California, and lectured at the University of Southern California.

Chicago Natural History Museum

Founded by Marshall Field, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
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Members are requested to inform the Museum promptly of changes of address.

APRIL'S
FEATURED EXHIBIT

What birds inhabit the Chicago region, and how may they be attracted to the garden? These are questions answered by the Museum's featured exhibit for April entitled, "Resident Birds of Chicago." The exhibit displays mounted specimens of typical birds of this area, and explains what plants may be grown to provide birds with food, nesting sites, and protection; what water receptacles, feeders, and foods are most satisfactory for local birds; and how feeding stations may be protected from bird enemies. The exhibit is located at the entrance to Hall 21 near the south end of Stanley Field Hall.



SURINAME EXPEDITION—

(Continued from page 3)

they return to their mother's back and twist their tails around that of the parent who runs with them into their hole again." In spite of the fanciful description of the tails of the young, and other inaccuracies, Merian's little animals can be positively identified with the mouse opossum bearing the scientific name *Marmosa murina* Linnaeus.

The next original contributions to Suriname mammalogy were published in 1734, also in Holland. They appear in the first two of four lavish folio-sized volumes, called the *Most Complete Thesaurus, or Treasury, of Natural History*. The author, Albert Seba, was a wealthy Dutch naturalist and his collection of plants and animals was then the finest of its kind. Most of the species shown in the *Thesaurus* had not been previously described or figured. Its armadillos reminded people of the armored beasts of mythology. The marsupials with their pouches for carrying young had never been imagined before. The huge bats were at once associated with legendary ghosts who sucked the blood of sleeping persons. The sloths and anteaters with their long fore-limbs armed with hook-like claws baffled all European savants of the time. Some depicted sloths in the impossible posture of standing on all fours, and others, like Seba, exhibited the animals in erect man-like poses.

Seba, like his contemporaries, gave only the vaguest indications of the places of origin of the animals mentioned in his *Thesaurus*. He did state, however, that most of the specimens were collected through his personal contacts in the Dutch colonies. With but one exception, all tropical American mammals described by Seba could and probably did originate in coastal Suriname.

The great value of the *Thesaurus* was apparent to Linnaeus. In the tenth edition of his *Systema Naturae*, published in 1758, the great systematist gave the first valid scientific names to 13 of the species of Suriname mammals described by Seba. This is extraordinary in view of the fact that the sum total of South American mammals known to Linnaeus was only 40. Today nearly 600 species



Suriname mammalogy began in 1719 with this picture of a mother mouse opossum with young on her back, their tails unrealistically lengthened and entwined around hers. The upper half of the plate shows the life history of the praying mantis. Adapted from INSECTS OF SURINAME by Maria Sybilla Merian.

are recognized. The Linnaean diagnosis and technical name for the common opossum of North and South America, *Didelphis marsupialis*, is based on Seba's account of the Suriname form. The other Suriname mammals of the *Thesaurus* which received technical names from Linnaeus and other systematists include the woolly opossum, the four-eyed opossum, the short-tailed opossum, Merian's opossum, the two-toed and three-toed sloths, the silky anteater, the cabassu armadillo, the squirrel monkey, the kinkajou, the remarkable fishing bat, *Noctilio leporinus*, the largest New World bat, *Vampyrum spectrum*, and the commonest tropical American bat, *Carollia perspicillata*. For well over two cen-

turies Seba's *Thesaurus* remained the source for the description of the greatest number of Suriname mammals based on actual specimens.

Expedition Objectives

The principal objectives of the Chicago Natural History Museum's expedition included the collection of as complete a representation as possible of the mammals of Suriname, particularly the rodents, primates, and the Linnaean species based on Seba and Merian. Field studies were to be made of the distribution and the relationship of the animals to their environment, especially in cultivated areas. Special attention was to

(Continued on next page)

(Continued from previous page)

be given to the preservation of the external parasites of mammals. An earlier Museum expedition to Suriname, conducted by Harry A. Beatty (see BULLETIN for December, 1961), had already made a good start toward these objectives, although its efforts were mostly devoted to collecting birds. With the completion of the present field work, all missions were accomplished. Now, the Museum's collection of Suriname mammals and mammalian ectoparasites is the largest and most varied in the world and the only one of its kind in the western hemisphere.

Field Work Begins at Carolinakreek

The expedition consisted of myself, Dr. Jack Fooden, a post-doctoral student in primatology, and one or two native assistants employed as needed. Dr. Fooden and I arrived in Suriname on November 15, 1961. Field work was initiated in Carolinakreek about 32 miles south of Paramaribo on the 22nd of November. The dry season had already ended and the rainy season was gathering force. The wild mammal population at this time was extremely low. The previous dry season had been unusually long and rigorous and few mammals survived it. Poor collecting here was aggravated by the great number of Sunday and holiday hunters who drove in from Paramaribo with their retinues and dog packs. I lost little time in finding a more secluded camp site, and on the fifth of December the expedition was installed at Loksie Hatti on the left bank of the Saramacca River high up in Bush Negro country.

Bush Negroes are descendants of slaves who escaped into the forest nearly three centuries ago. Today, these proud and independent people conserve much of the way of life of their West African ancestors. They live in palm-thatched huts in small clearings along the banks of the river. They cultivate corn, plantain, cassava, and other tubers, raise some chickens, hunt and fish. Most of the men are skillful wood carvers and decorators and their most artistic work is done to curry the favor of their betrothed or to hold the affection of their wives. The Negroes can eschew the degenerating comforts and nerve-wracking

inventions of European civilization, but they cannot resist the status symbols of outboard motors for their dugout canoes, battery powered radios, cardboard suitcases for their meager personal effects, and even umbrellas. All these they can and do acquire from the proceeds of logging, rubber hunting, and other exploitations of the forest.

Bush Negroes speak a language of their own called *talkee-talkee*. It is a mixture of Dutch, French, English, Portuguese, and West African. A young Bush Negro, Edwin Dafit, whom I employed in the Saramacca, had no difficulty in communicating with me although neither he nor I understood more than a few words of each other's language. Edwin was neat, intelligent, could read and write *talkee talkee*, had a fine sense of humor, and was a good worker.

Collecting in the Saramacca

Theoretically, every species of Suriname mammals could be found at one time or another in the Saramacca region within a half day's walking or paddling distance of my camp. A few species, particularly marmosets and monkeys, might be encountered daily. Some mammals would appear only during certain fruiting seasons. The vast majority of species, however, are never seen, at least during the day. They may be trapped or hunted at night in some seasons and might just as well be forgotten at other times of the year. Many species live in places which the best of collectors might overlook, and the rising river had made it difficult or inexpedient to search for mammals with pronounced aquatic proclivities.

Cultivated and fallow fields bordering on the forest create exceptions to the ordinary relationship between the animal and its habitat. The fields are magnets for many kinds of small herbivores, particularly rodents and, naturally, the train of carnivores which preys upon them. Because the fields are relatively secure as habitats, and provide an abundance of food, they sustain abnormally large numbers of individuals.

Intensive trapping and hunting for small mammals in climax forest on the camp side of the river was hardly rewarding. In spite of all efforts and every guile, I got no Merian's opossum and no specimens of a common water rat from

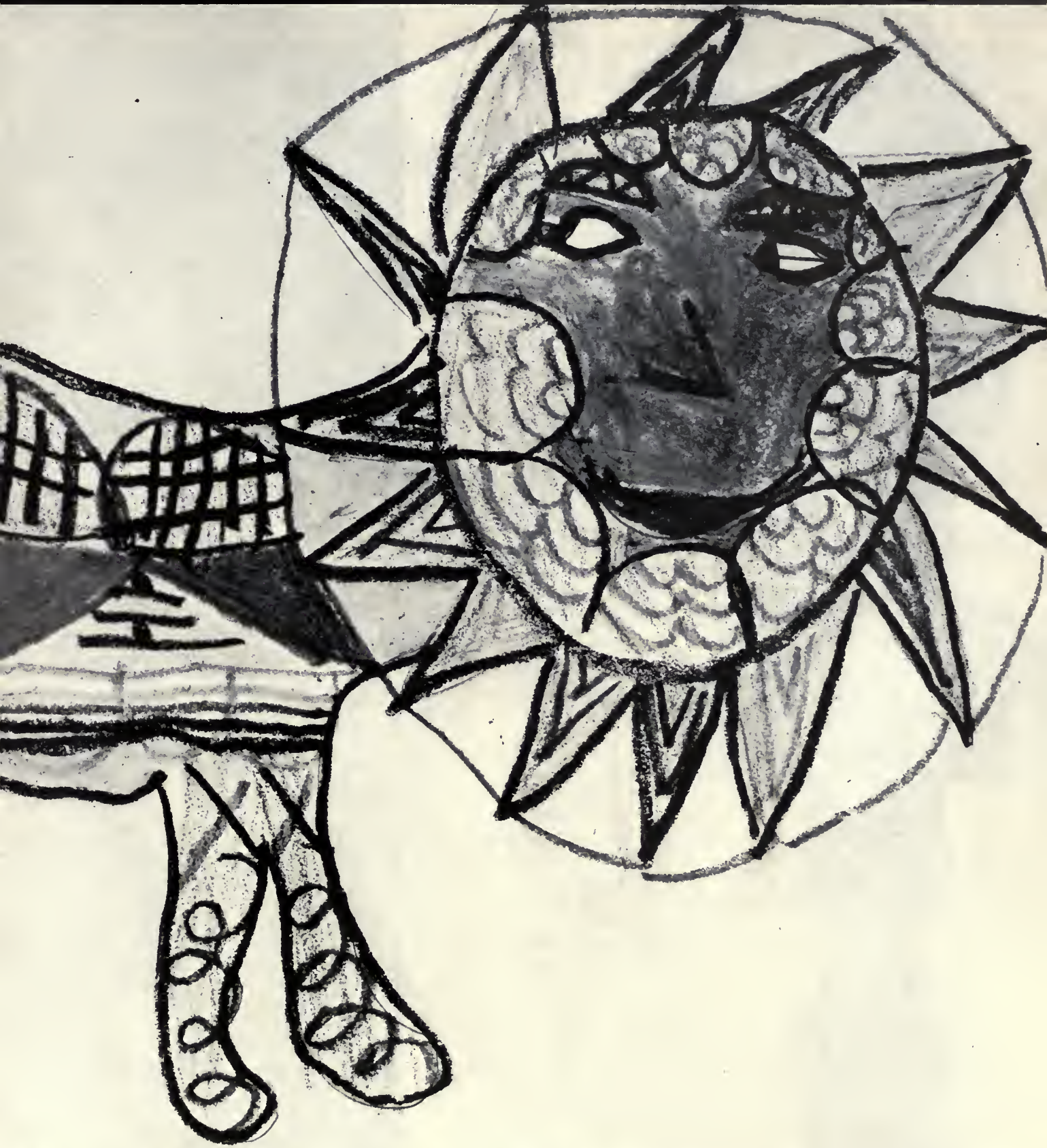
this forest. In contrast, traps set in a cassava field upstream on the other side of the river yielded Merian's opossum, water rats, and other kinds of small mammals which were not taken in their natural forest habitat.

Mammals of the Coastal Region

After a month at Loksie Hatti, the number of different species being added to the collection had fallen to a point where it was no longer feasible to continue operations there. The next few weeks, from mid-January to early February, were spent in the intensively cultivated coastal region. Three stations were worked successively. The first was in Lelydorpplan, an agricultural colony about 15 miles south of Paramaribo; the second at La Poule, a government experimental farm specializing in citrus fruits about 21 miles west of Paramaribo; and the last was at Dirkshoop, a citrus farm five miles farther west. The most abundant native mammals here were squirrel monkeys, sloths, common opossums, Merian's opossums, raccoons, spiny rats, cotton rats, the common bat, *Carollia*, and the nectar-eating bat, *Glossophaga*. The same species were present but rare at Loksie Hatti. A progressive increase in the number of rats, bats, and small opossums was noted with the advancing rainy season. Collecting now called for more ingenuity and foresight than ever to prevent the common species from monopolizing the traps.

By mid-February, it was time to complete our preparations for the return trip to Chicago. In the final days remaining to us, some collecting was done in and about Paramaribo in collaboration with Dr. Van Dosburg Jr., Chief Zoologist of the Suriname Ministry of Agriculture.

The cost of the expedition was defrayed by a grant from the National Science Foundation. Much of the success of the expedition was due to Dr. D. C. Geijskes, Director of the Suriname Museum in Paramaribo, who provided many facilities and assisted in other ways in expediting our work and travels. Studies of the collection in the Museum's laboratories have already been initiated, and the results will be published in scientific journals.



CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

VOLUME 33
NUMBER 5
MAY 1962

RIGHT: SHAMAN'S MASK. 19th Century.
Tlingit Indians, Alaska

LEFT:
RELIQUARY FIGURE
Early 20th Century.
Bakota Tribe,
Gabon Republic, Africa

THE PRESENTATION OF
in Primitive Art" as
May signals the open-
new Hall of Primitive
galleries of its kind in



"The Human Image
the featured exhibit for
ing of the Museum's
Art, one of the largest
the world.

The exhibit brings to culmination more than two years of
work. From the fifty to one hundred thousand specimens of
primitive art in the Museum's archaeological and ethnological
collections, more than 200 objects have been selected for
display in the new exhibit. These have been drawn largely
from primitive societies of Africa and the Oceanic areas of
Melanesia, Polynesia, Micronesia, and Malaysia; and also in-
clude art works from American Indian societies of North and
South America.



The subject of the exhibit—
the human image itself—is the
most universal in the art of any
people and is especially preva-
lent in primitive art. Visitors to
the Hall will see man—and some
of his gods—portrayed in a mul-
tiplicity of ways: in calm and
supernal beauty, as ferocious and
cruel, or as satirical and funny.

The first art was probably not
painting or sculpture at all, but
the posing, gesturing, and danc-
ing of the living person. Thus
many of the images of man pre-
sented in the Museum's new ex-
hibition picture him in elaborate
dress, ready to take part in the
important social, ceremonial, and
religious occasions of his life.
Such moments were caught and
fixed by the tribal artists in sculp-
ture, painting, or in the ornamen-
tation of utensils and weapons.



BELOW: DANCE MASK
Early 20th Century.
Bafut Tribe,
Cameroons, Africa

LEFT: PORTION OF CHIEF'S STAFF
Early 20th Century.
Ovimbundu Tribe,
Nigeria, Africa



Photographs by John Bayalis and Homer Holdren

THE HUMAN IMAGE in Primitive Art

By Phillip H. Lewis
Curator, Primitive Art



ABOVE: *BEGGING FIGURE*

Early 20th Century.

Baluba Tribe,

Congo area, Africa

RIGHT:
DETAIL OF
HEADRESS FIGURE
Early 20th Century.
Ibibio Tribe,
Nigeria, Africa



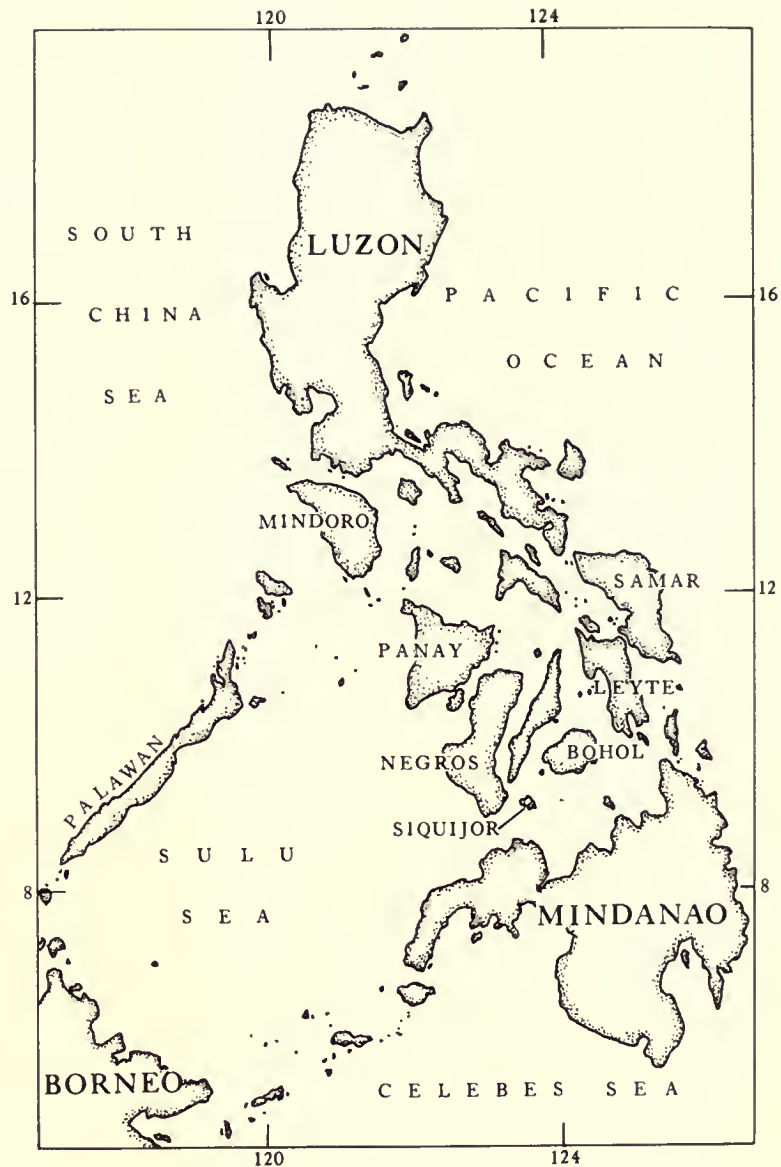
Other pieces in the exhibit are memorial statues of deceased relatives, sometimes shown in funeral attitudes, sometimes in poses symbolic of ferocity in war or virility in procreation. These figures evoke powerful images of real persons attempting to establish immediate and personal relations with the supernatural forces and beings that governed their lives.

Deities are depicted either directly or through the portrayal of human beings costumed as gods. Thus, although the art objects have been removed from their religious and social contexts, the new exhibit presents a fragmentary view of a hundred religions, as well as a gallery of the myriad art styles of the primitive world.

The new Hall of Primitive Art is located on the main floor of the Museum adjacent to Stanley Field Hall. It encloses 9,000 square feet of exhibition area. An earlier exhibit, "Primitive Man Looks at Civilization" (see BULLETIN for July, 1961) opened last July in the new Hall and, together with the present exhibit, will remain on display for an indefinite period.

AUSTIN L. RAND
CHIEF CURATOR
ZOOLOGY

A ZOOLOGICAL EXPEDITION TO THE *PHILIPPINES*



FOR twelve years, the study of Philippine birds has been one of the continuing projects of the Museum. This work has been made possible by cooperation between the Museum and Dr. D. S. Rabor of Silliman University, Negros, P. I., who has interests similar to ours. Dr. Rabor heads the science department of his university. Each vacation period, he takes a group of his students on a field trip to a different part of the archipelago, where they study and collect natural history material, and especially birds. This field work we aid with some travel funds and some collecting material. In return, many of the specimens collected come to the Chicago Natural History Museum, where our large collections provide a basis for com-

parative and critical studies.

While Rabor's studies are mostly done in the field, he has spent parts of two years in Chicago, working in the Museum. While my work has been mostly done in the Museum, I have spent a few months in the field with Rabor. As long range projects, Rabor is writing an up-to-date handbook of Philippine birds, while I have a check-list of Philippine birds in manuscript. Each year, there is a quantity of new data to add to both.

It seems timely to pause and review what we have accomplished. The most obvious is the splendid collection of birds we have built up at the Museum. The main islands—Luzon, Mindanao, Samar and Negros—are well represented, and from the first two we have collec-

tions from different parts of the isles showing that each may be as different as are different islands. We also have important collections from Bohol, Palawan, Calamianes and Cebu, and through earlier exchanges with the old Philippine Bureau of Science we have some specimens from many other scattered islands.

But the possession of specimens is only the beginning. They are the raw material from which one reads new knowledge, the reference material needed to document old knowledge and to re-interpret it in the light of subsequent discoveries. Though the major reports are still in manuscript, we have published preliminary studies on some of our findings. These include some twenty papers totaling over 300 pages.

Most outstanding are the novelties discovered. We have described two new bird species. One is a small, greenish babbling thrush of the trees, the other a brown babbling thrush of the forest floor. We have described nearly two dozen new subspecies, some of them, like the little red-headed owl of Negros, so different from their nearest relatives that perhaps they, too, should be considered species.

Not as exciting, perhaps, but even more intriguing are the half dozen cases where we have discovered that what has been considered one variable species really represents two quite different ones. For example, a large brown fruit pigeon is widespread, with a different subspecies on each major island. But we found that both the endemic Mindanao form and the form thought to be restricted to adjacent Basilan actually occur together on the former island and behave there as two species, which we now consider them to be. The Basilan bird, in the isolation of its original island home, has evolved into a species that was able to recolonize Mindanao, despite the occupation of the island by the Basilan's closest relative.

A special case of this "circular overlap" is shown by certain little green leaf warblers. One type "A" lives on Negros and other southern and central islands; another type "B," which looks to be a subspecies, is found only on Luzon; a third type "C" lives on Negros, and would be considered a third subspecies if it did not overlap the range of "A." As subspecies cannot live together, "A" and "C" must be considered species. The status of the perplexing "B" is solved by linking it arbitrarily with "A," with the mental reservation that here we have a case where two species have evolved without the connecting link between them having yet been lost.

A large green parrot has provided a case of what we call a checkerboard pattern of variation. The birds of adjacent islands are sufficiently different in size and color to be recognized as subspecies if it were not that the same characters are repeated in more distant populations.

For example, the Palawan and Mindanao populations, or the Talaut and Siquijor, are quite similar, but they are separated by large areas inhabited by different populations. The taxonomic

treatment of this type of variation by using subspecies names for each population, based solely on geography, is unsatisfactory, so we lump them together but point out that a checkerboard type of variation exists. For such studies, large series of specimens are obviously essential.

We have recorded birds new to the Philippines, as well as new range extensions within the Philippines. For instance, thirteen species have been added to those known from Siquijor, 25 species to Bohol, and nineteen to Samar. These are the three islands for which we have published complete lists, as well as discussions of their zoogeography and ecology. There is hardly a page in the older books on Philippine birds which does not need revision on the basis of our studies.

The past geological history of the Philippines has had its effect on bird distribution, and for the study of this zoogeography knowledge of the precise ranges of the birds is important. For instance, the main islands of Luzon, the eastern islands of Samar and Leyte, and Mindanao, have similar birds and are grouped together as the "eastern province" of the Philippines. One unexplained range was that of the little crow that was recorded from Samar and Mindanao but not found on Luzon, despite the great amount of collecting that has been done there. There seemed to be nothing in zoogeography to explain this. Then Rabor collected two specimens on northern Luzon, showing that the bird does occur there (incidentally, it was a new subspecies), though it is very rare. This recalled that it was also rare in Mindanao, though common on Samar. One suspects here that ecological rather than geological factors are the important ones in determining its occurrence as well as its abundance.

In an attempt to sort out the ecological from the zoogeographical effects on distribution, we examined the small island of Siquijor, which is about fifteen miles out in the Sulu Sea from Negros. A comparison of the two islands is as follows:

Negros, area 12,699 square kilometers . . .	183 breeding birds
Siquijor, area 235 square kilometers	83 breeding birds

This illustrates that the smaller an is-

land, the smaller the avifauna. We have discussed this and other small island effects under such headings as "distance from other islands," "size of island," "first arrivals excluding other colonists," "occurrence of two species in a genus," "small island species" (some Philippine species, like the big white nutmeg pigeon, live only on small islands—why, we do not know), "change of habitat on small islands," and "patterns of variation" (for example, birds on small islands tend to have longer bills).

Another interesting and puzzling point about Siquijor is that certain migrants from Asia are much more common as winter visitors on this little island than they are on other nearby larger islands.

What all these factors mean is still imperfectly known, but at least we are finding out some of the facts of distribution and occurrence which will repay more study, and island distribution and speciation can nowhere be better studied than in the Philippines, where there are more than 7,000 islands displaying a remarkable range in size.

Taxonomy and distribution, the kinds of birds there are and where they live, are the mainstay, the "bread and butter" work, of a museum ornithologist. But many other points emerge in the course of studies, either from looking at specimens or from field reports.

In one shipment to the Museum, a bulbul's nest had withered brown leaves in its lining, leaves that forcefully reminded me of the snake-skin used in a Madagascar bulbul's nest. This sparked a review of the use of shed snake-skins in birds' nests, with the conclusion that the important question is not why some birds use shed snake-skins, which are very suitable material, but the more general one of why some species of birds use nest materials which are characteristic and different from those of other related species.

A dried tongue attached to a specimen of flowerpecker provided material for reviewing the relationships of the flowerpecker family. The tongue was brush-tipped and quite unlike that of any other flowerpecker, but very similar to that of certain honeyeaters. Supported with certain other data, including the nest structure, it appears that flowerpeckers

(Continued on page 7)

**Sharat K. Roy
(1898-1962)**

Dr. Sharat Kumar Roy, Chief Curator of the Department of Geology, whose death occurred on April 17th, was a distinguished scientist of outstanding ability and achievement.

Dr. Roy was born in India in 1898, and attended the University of Calcutta and the University of London. He came to the United States in 1920 and graduated from the University of Illinois in 1922.



Sharat K. Roy

He received the degrees of Master of Science in 1924 from the University of Illinois and Doctor of Philosophy from the University of Chicago in 1941.

He began his professional career in the Department of Geology of the New York State Museum in Albany, and joined the staff of Chicago Natural History Museum in 1925 as an Assistant Curator in the Department of Geology. He has served continuously with the Museum since that time, becoming Chief Curator of his department in 1947.

Dr. Roy served in the British-Indian Army during World War I. In World War II he received a commission as Captain in the United States Army Air Forces and was discharged with the rank of Major in July, 1946.

In addition to many collecting trips in various parts of the United States, Dr. Roy was a member of the Second Rawson-MacMillan Subarctic Expedition of Field Museum in 1927-28; and he collected ores, lithological specimens and Paleozoic fossils in Newfoundland the following year. In 1945, on leave from the United States Army, he collected Permian fossils in mines in eastern India and in the Salt Range of northern India.

From 1953 to 1961 Dr. Roy conducted six field trips to Central America to study the volcanos of that region. In

1957-58 he spent one year in Europe and India under a National Science Foundation grant, engaged in research and consultation on stony meteorites, concentrating on those containing rounded bodies called chondrules.

He has published more than 30 scientific papers in the fields of invertebrate paleontology, meteoritics and volcanology, and was a Fellow of the Royal Geographical Society as well as a member of numerous professional societies.

In recognition of his exploratory geological work in the Arctic, the United States Coast and Geodetic Survey, in 1944, honored him by designating one of the mountain peaks on Baffin Island as "Mount Sharat."

With Dr. Roy's death the Museum staff has lost a colleague of unassuming and gentle temperament. He will be missed by all who had the privilege of knowing him.

**Tutankhamun Treasures
Coming to Museum**

An exhibit of treasures from the tomb of King Tutankhamun will be presented at Chicago Natural History Museum from June 15 through July 15 under joint sponsorship of the Museum and the Oriental Institute of the University of Chicago.

The pieces assembled for this exhibit are touring major American museums to arouse interest in the international effort to save a number of ancient Nubian monuments from being inundated by the waters of the Nile on completion of the Aswan Dam. Usually on display in the Cairo Museum, the King Tut treasures have never before been permitted to leave Egypt.

Tutankhamun was King of Egypt about 1350 B.C. His tomb, with its incredible treasures, was discovered by Lord Carnarvon and Howard Carter in November of 1922. The opening of the inner burial chamber of the Pharaoh in the following February stirred the interest of the entire world, both because of the intrinsic value of the tomb con-

Chicago Natural History Museum

Founded by Marshall Field, 1893

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tents and because they had been preserved, through more than thirty centuries, in all their pristine beauty.

From the more than 2,000 exquisite objects found in the tomb, the 31 pieces selected for the traveling exhibit are of particular interest because of their close association with the mummified body of the boy-king. Among them are his favorite hunting dagger and sheath of embossed gold, found in the mummy wrappings; a richly decorated miniature coffin of gold, inlaid with carnelian and lapis lazuli—one of four that held the ruler's internal organs; the ceremonial crook and flail, fashioned of gold and blue glass, which were the symbols of his power; jewelry taken from the body; the young king's walking stick, embellished with a portrait figure in solid gold; and many vases, chests, and



Figure of young King Tutankhamun in solid gold embellishes a gold walking stick found in the tomb—one of 34 treasures from tomb that will be on display June 15 through July 15.

statuettes of deities that would have significance in the Pharaoh's life beyond the grave.

Also on display will be several objects from the tomb of Sheshonq I (the Biblical Shishak); several pieces from the permanent Egyptian collections of the Oriental Institute and Chicago Natural History Museum; and a stone statue from the Egyptian Old Kingdom (about 2,500 B.C.) which was a gift from the United Arab Republic to President and Mrs. Kennedy at the opening of the exhibit in Washington, D.C. This statue forms a part of the traveling exhibit at Mrs. Kennedy's request.

The exhibit of Tutankhamun treasures was organized by the American Association of Museums with the cooperation of the Ministry of Culture of the United Arab Republic and the Cairo

Museum. It is being circulated in this country under auspices of the Traveling Exhibition Service of the Smithsonian Institution.

Children's Art Exhibit

An exhibit of 50 paintings and drawings by young artists of the Junior School of the Art Institute will be displayed in Stanley Field Hall from May 5 through June 3 (see cover). As part of their regular course of instruction, students in the Junior School visit the Museum regularly to study plant, animal, and geological structures; forms of primitive art and design; and the art techniques of ancient or remote civilizations. The colorful and imaginative works selected for the show, entitled "A Child's World of Nature," were inspired by exhibits at the Museum. Later in the year, the exhibit of children's art will be circulated to other cities under auspices of the Traveling Exhibition Service of the Smithsonian Institution.

Science Fair

Science projects designed by students of the Chicago area will be exhibited in Stanley Field Hall from 9 A.M. until 4 P.M. on Saturday, May 19, in the 12th Annual Chicago Area Science Fair. The young scientists who will explain their displays and demonstrations are students from the sixth grade through the final year of high school. They represent public, private, and parochial schools (as well as a number of youth organizations) located within a 35-mile radius of Chicago. The science exhibits will relate to living things (including man), geology, astronomy, matter, and energy. Awards will be presented at the end of the day on the basis of the student's knowledge of his project and on the attractiveness and originality of his exhibit. The fair is sponsored by the Chicago Area Teachers Science Association.

Staff Lecture

The Northwestern University Geology Club heard Bertram G. Woodland, Associate Curator of Petrology, speak recently on "Methods and Results of the Analysis of Small Scale Structures in Metamorphic Rocks."

Free Concert

The Chicago Chamber Orchestra completes its concert season in the Museum this year with its performance on Sunday, May 13, at 3:30 P.M. in the James Simpson Theatre. The conductor will be Dr. Dieter Kober. Recently the Chicago Chamber Orchestra was featured in a half-hour program on CBS television entitled "Music for a City."

Longer Museum Hours

Beginning May 1 the Museum will be open from 9 A.M. to 6 P.M.

PHILIPPINES EXPEDITION

(Continued from page 5)

are probably more closely related to honeyeaters than has been thought.

A young female hornbill from Mindanao had the head partly black, like the adult female, and partly rufous like the adult male. Examination of the skin showed that the bird was in moult, the rufous feathers being replaced by black ones. In birds generally, when the sexes are different, it is the female that both young resemble, but here we had an example of a species in which both young resemble the male. This phenomenon is not unknown, but it occurs rarely, and in widely separated families.

When Dr. Rabor and I were traveling on Siquijor Island, we discovered that the ruddy kingfisher, which lives in the forest, feeds to a considerable extent on snails. The bird opens the shell to get the meat by pounding the snail on a rock, a habit which is shared by no other kingfisher, so far as we know, and by very few other birds.

Also from our Philippine field work, and more especially that of Rabor, it seemed to us that the domestic fowl of the villages and the jungle fowl of the forest, though belonging to the same species, each lived on the same islands with very little hybridization. Apparently they are kept separate by their respective habitat differences. Here we seem to have an example of an unusual state of affairs for birds: two subspecies living in the same area, but in different habitats.

(Continued on next page)

(Continued from page 7)

Deforestation and other attendant changes have caused the extinction of island birds, as is especially well known for the West Indies and the Hawaiian Islands. No such cases were known from the Philippines. But after extensive field work on the island of Cebu, from which most of the forest has gone since Magellan landed there early in the 16th Century, Dr. Rabor decided in 1959 that all but one of the ten endemic Cebu forest birds had disappeared with the forest. Among the birds not seen since 1906 was the golden washed hanging lorikeet. However, we have since found that it existed up until 1930, for about then a considerable number were brought alive to Europe and the United States as cage birds. This was brought to our attention by Mr. Karl Plath, formerly of Brookfield Zoo, who, reading Rabor's account, brought to us an example of one of these 1930 birds which he had had alive for a time.

The destruction of forests, especially in the lowlands, lends urgency to some collecting, notably on Panay and the Romblon-Tablas group. The Sulus, with such striking endemics, are unfortunately so filled with unrest as to make work there impractical, and the same is true for parts of Palawan and southeastern Mindanao. But there are still parts of Palawan that would be worth while.

The new species discovered in recent years from Luzon, Negros, and Mindanao, some from areas "well collected," may serve as a guide to indicate that almost any upland forest in the Philippines may yield more new forms or range extensions. And the abundance of small islands in the Archipelago makes an ecological study of island effects an inviting prospect.

The above will give some idea of the progress that Dr. Rabor and I have made in the study of Philippine birds, the use we have made of the collections, the information we have read from skins and observations, and made available to the scientific world. The work is continuing, but is never done.

In planning for the future, we must keep in mind that our space, material, money, and also time (for our years are numbered) are limited; and that I have interests in other parts of the world, too!

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CHICAGO NATURAL HISTORY MUSEUM PRESS



By Deborah Axner

From "A Child's World of Nature": An exhibit of children's art
Stanley Field Hall, May 5 through June 3

CHICAGO
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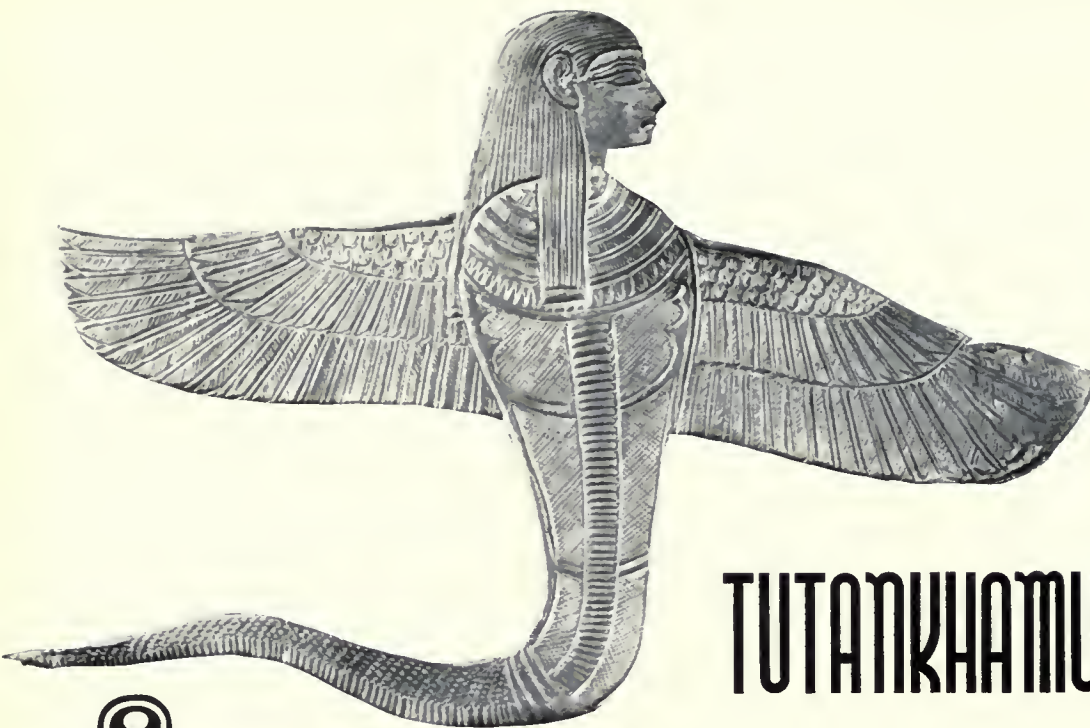
Vol. 33

No. 6

June

1962





An invitation to an EXHIBITION of the

TUTANKHAMUN TREASURES



ON June 15, history will turn back more than 3,000 years for an intimate look into the life of Egypt's most publicized boy king when the exhibit of treasures from the tomb of King Tutankhamun opens at Chicago Natural History Museum.

Members of the Museum and the Oriental Institute of the University of Chicago—joint sponsors of the exhibit—have received invitations to a Members' preview on Thursday evening, June 14.

A special attraction of the preview will be a lecture in James Simpson Theatre on "Tutankhamun and his Treasures" by Dr. Ahmed Fakhry, Professor of History of Ancient Egypt and the East at the University of Cairo. Dr. Fakhry will also lecture at the Museum on the same subject on Friday, June 15, at 7:00 P.M. and on Sunday, June 17, at 3:00 P.M.

The carpenters, electricians, and painters will soon complete their work on Hall 9, which has been completely remodeled for the *Tutankhamun Treasures* exhibit under plans drawn up by Phillip H. Lewis, Curator of Primitive Art, and James Shouba, Superintendent of Maintenance. Four huge lighting panels, suspended from the ceiling, will illuminate the exhibit and emphasize the exquisite craftsmanship and delicate artistic style of the jewel-like objects. An example is the young king's favorite hunting dagger, of gold, on which an incised group-

ing of wild animals attacking each other forms an interlacing pattern. Also of interest to art lovers will be the solid gold figurine of King Tutankhamun on the head of his walking stick, and the miniature mummy case, inscribed with hieroglyphics and richly decorated with semiprecious stones.

Most of the 34 objects on display are made of gold, decorated with inlaid lapis lazuli, carnelian, and colored glass. Two vases, a painted chest, and the lid of a canopic jar—beautifully carved in the form of the king's head—are of alabaster.

Several objects—amulets, rings, cere-

monial necklaces, and the dagger—were actually found on the king's mummy. A flail and a crook, of gold and blue glass, symbolize the Pharaoh's power as shepherd of his people and overseer of their efforts. The crook can be found today as the staff of Christian bishops while the flail survives as the ceremonial fly-whisk of African chiefs.

Augmenting the exhibit will be several pieces from the permanent Egyptian collections of the Oriental Institute and Chicago Natural History Museum.

Large photographs of the Nubian monuments and temples on the banks of the Nile will serve as a background for the tomb treasures. Probably the most dramatic are those showing the great rock-cut temple at Abu Simbel with its colossal statues of Rameses II and his queen, Nefertari (mother-in-law of King Tutankhamun). The purpose of the exhibit is to arouse support for the salvage program, sponsored by UNESCO, to save these ancient monuments from being destroyed by the waters of the Nile after scheduled completion of the Aswan Dam in the late 1960's.

Although general admission to the *Tutankhamun Treasures* will be 50 cents for adults and 25 cents for children, Members of the Oriental Institute and Chicago Natural History Museum will be admitted free. Beginning June 15, the Museum will be open from 9 A.M. to 8 P.M. on Wednesday, Friday, Saturday, and Sunday, closing at 6 P.M. on the other days of the week.



THE MYSTERY of the TOLTEC HEAD!

DONALD COLLIER

Curator, South American Archaeology and Ethnology

MUSEUM discoveries are associated in the public mind with expeditions to far places. Although expedition finds are most newsworthy, equally interesting discoveries are frequently made in the course of study of the Museum's research collections.

An intriguing example of such a discovery occurred recently in the Department of Anthropology. In connection with the rearrangement of the research collection on Mexican archaeology, we undertook the sorting and classification of several thousand human figurines of terra cotta from the Valley of Mexico. These came from several cultures and date from 1000 B.C. to A.D. 1500. Aside from their aesthetic interest and their value for yielding cultural information, these figurines serve as "index fossils" in dating the various archaeological periods in central Mexico.

At the end of the classifying job, I was examining the remaining miscellaneous lot of unclassified figurine fragments when I noticed the hollow head of a man that struck me as familiar. After examining it I decided that the color and texture of the clay reminded me of an incomplete Toltec cup that had been placed on display in 1959 in the new exhibits on Mexican archaeology (Hall 8, Case 63). The handle of this cup was modeled into the effigy of a man, whose head had been missing since the piece was acquired by the Museum. A quick visit to the Mexican hall confirmed my hunch, and upon opening the case we found that the head discovered among the fragments fitted perfectly. We have now made a permanent restoration of the head to the body, from which it was separated for more than sixty years, and the complete specimen is once more on exhibit.

I turned to the catalogue and accession records for a solution to the mystery of the missing head. It had been acquired by the Museum in 1905 as part of a large collection of Mexican antiquities and ethnological objects purchased from Fredrick Starr, who was professor of anthropology at the University of Chi-



cago from 1893 to 1923. The cup was in a collection of archaeological specimens presented to the Museum in 1923 by the late Martin A. Ryerson, a Benefactor of the Museum and for many years a member of the Board of Trustees. Because of the freshness of the break on the effigy cup it appeared highly probable that the fracture had occurred relatively recently and almost certainly since the specimen had been excavated. I therefore looked for a connection between the Starr and Ryerson collections. I discovered that the head had been purchased by Professor Starr in about 1895 from the collection of Antonio Peñafiel, a well known Mexican archaeologist and collector. The Ryerson collection was



shipped from Mexico in 1895. There is no record that the cup came from the Peñafiel collection, but identification marks on its base are similar to marks on known Peñafiel pieces.

The evidence points to the following probable course of events. The cup was intact when excavated and acquired by Peñafiel. While in his possession and prior to 1895, the head was broken and separated from the cup. Mr. Ryerson's agent acquired the cup in 1895 or slightly earlier, and probably Professor Starr bought the head after the cup had been sold. The two parts came under the same roof again in 1923 but were not reunited until 1961.

The cup, which is shown in its completed form in the accompanying illustrations, was found in Tlapanaloya, Dis-



trict of Zumpango, about 25 miles north of Mexico City and closer to Tula, the Toltec capital. The slightly humpbacked figure that serves as a handle is modeled in Toltec style.

The man depicted wears elaborate earplugs, a necklace, and a tassled gee string tied with a single bowknot at the back. At the front of the cup is a molded design in relief depicting the typical Toltec prowling jaguar. The low ring base of the cup is also characteristic of the Toltec period. It is estimated to date from the tenth century A.D. It is a most interesting example of Toltec art, now to be seen in its original form as the result of a quiet but profitable adventure among the collections of the Museum.

NSF Awards Grant for Borneo Study

Dr. Robert F. Inger, Curator of Amphibians and Reptiles at Chicago Natural History Museum, and Dr. Bernard S. Greenberg, Professor of Biology at Roosevelt University, have been awarded a \$35,100 grant by the National Science Foundation for research on the "Reproductive Patterns and Population Structure of Borneo Amphibians."

Borneo is a part of the oriental tropics where much of the evolution of contemporary groups of reptiles and amphibians has taken place. Within these tropics, the most stable and favorable

1956. This year, he and Dr. Greenberg will spend three months in Borneo establishing a field base, mapping the area, and training assistants. When they leave the island, the field work will continue under the supervision of Mr. F. W. King, a graduate student of the Department of Zoology of the University of Chicago. It is estimated that approximately 6,000 frogs, snakes, and lizards will be collected during the first two years of the NSF grant. On returning to the Museum, Inger and Greenberg will carry out detailed studies of these specimens. A full report of the research will be prepared during the fourth and final year of their study.



Melvin A. Traylor, Associate Curator of Birds, who returned recently from a six-months' expedition to Africa, examines one of the more than 1,500 birds collected during his trip.

Focus of Traylor's field work in Africa was Barotseland, a British Protectorate in Northern Rhodesia. There Traylor discovered two subspecies of lark never before described. The expedition was supported jointly by the Museum and the National Science Foundation.

environment is the evergreen rain forest, which has probably been in continuous existence in Borneo for at least 50 million years. The advantageous qualities of the rain forest have fostered the evolution of more groups of organisms than any other terrestrial habitat.

The organization and dynamics of the animal community living within such a rain forest are virtually unknown. Inger and Greenberg, therefore, intend to study the size and composition of the animal population, the movements of individuals of various species, and the annual reproductive patterns of the amphibians of these forests.

Dr. Inger has long been interested in the animal life of Borneo, having made collecting trips to the island in 1950 and

Research Report from Hawaii

A recent report from Hawaii, where Museum field work is also being supported by a grant from the National Science Foundation (see BULLETIN for August, 1961), illuminates another aspect of the research being done by Museum zoologists abroad.

Dr. Alan Solem, Curator of Lower Invertebrates, has been in Hawaii on the first stop of a round-the-world study trip. The Hawaiian Islands are renowned both for their manifold, beautiful land snails and for their equally beautiful sea shells. To study them, Dr. Solem has not, as one might think, prepared to do research in the field, well supplied with different kinds of nets and

bottles full of alcohol. Rather, his equipment so far has consisted mainly of a microscope, calipers, drawing material, and a camera.

His work has chiefly been done in the laboratories of the Bernice P. Bishop Museum in Honolulu, which has rich collections of some kinds of snail shells in which Dr. Solem is greatly interested—tiny shells that look very inconspicuous and almost identical to the naked eye. Under enlargement, however, a great number of distinguishing characters are revealed, and these characters vary greatly according to the individual kind of shell. The describers of these shells, working 50 to 100 years ago, did not have the elaborate optical equipment we now possess; hence their descriptions are partly deficient, partly faulty. And what is more, they even confused shells of similar size and sculpture, believing them to be identical.

Here is where Dr. Solem's work began. He has been studying the specimens of earlier scientists and improving their descriptions by amending errors or by adding newly discovered characters. To his surprise, and almost to his dismay, he has also found that there are many tiny shells still undescribed at all. More than 300 of these await recognition as probable new species, while about 4,000 have so far been restudied and catalogued.

Thus one of our staff members uses his absence from the Museum to further science, not in the field, but in the laboratory.

Western States Field Trip

William B. Turnbull, Assistant Curator of Fossil Mammals, is presently traveling through a number of western states on a geology reconnaissance trip for the purpose of locating Mesozoic mammal localities. Included in his survey of North Dakota, Montana, Wyoming, and Colorado is a stop at Como Bluff, Wyoming, one of the most famous early mammal localities. Como Bluff is part of the Morrison formation noted for important dinosaur finds. It also has been the center of Mesozoic mammal discoveries.

Honored

Dr. Alfred E. Emerson, Research Associate, Insects, in the Museum's Department of Zoology and Professor of Zoology at the University of Chicago, recently was elected a member of the National Academy of Sciences. The Academy, which has been informally called the "hierarchy of American science," functions as an advisory body on scientific matters for the government. Its members are chosen for their distinguished and continued achievements in original research.

Emerson is the world's leading authority on the classification and biology of termites and is internationally known for his contributions in the field of evolution. He is one of the few systematic zoologists to become a member of the Academy, another being the late Karl P. Schmidt, former Chief Curator of Zoology at this Museum.

During his affiliation with Chicago Natural History Museum, Emerson has made notable contributions to the Museum's insect collections. Outstanding among them is a termite collection that is considered one of the finest in the world.

Summer Children's Journey

Young "rock hounds" interested in adding to their collections this summer won't want to miss the Museum's new Journey for children, "Down to Earth,"

which began June 1 and will continue through August 31. A planned excursion through the Museum's geology halls, the Journey offers young "prospectors" helpful hints on finding and identifying rocks in the local area.

Youngsters wishing to take the Journey may obtain further information and a Journey itinerary at the Information Desk and at the north and south doors of the Museum. A questionnaire is to be answered during the course of the Journey and turned in at the door before leaving the building. Completed questionnaires are then recorded so that each child will receive credit for his Journey. Each spring and fall, at a special honors program, children who have successfully completed specified numbers of Museum Journeys are presented awards for their achievement. The Journeys are sponsored by the Museum's Raymond Foundation.

Annual Lapidary Show

The 12th Annual Amateur Handcrafted Gem and Jewelry Competitive Exhibition, to be shown June 8 through July 8 in Stanley Field Hall, once again will demonstrate that common earth materials in the hands of a craftsman can be fashioned into objects of unusual beauty.

The exhibition will feature prize-winning jewelry of polished stone, polished

Chicago Natural History Museum

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.

slab collections, enameled stone work, cabochoned and faceted gems, and gem collections. Exhibitors are amateur lapidary artists residing in the Chicago area. Approximately 100 winning entries will be included in the display, which is sponsored by the Chicago Lapidary Club.

Exhibit-of-the-Month

"The Human Image in Primitive Art," which opened the Museum's new Hall of Primitive Art on May 1 and was the featured exhibit throughout that month, will continue to be featured during June. This exhibit-of-the-month program, begun a little more than a year ago, calls attention to the Museum's outstanding permanent exhibitions—some of them new, and some old. The exhibit, "The Human Image in Primitive Art," displays more than 200 specimens from primitive societies of Africa, Oceania, and North and South America.



On Members' Night, 1962 (held April 27), 1,638 Members enjoyed a once-a-year opportunity to browse through workshops, research collections, and staff offices not ordinarily open to the public. In each of the Museum's four departments—anthropology, botany, geology, and zoology—staff scientists and scholars prepared special demonstrations relating to their fields of study. Here we see Dr. Kenneth Starr, Curator of Chinese Archaeology and Ethnology, explain how to look up a word in a Chinese dictionary.

In the summer of 1917 a young cooper made his first trip to Alaska and began working at a whaling station. The arrival of a loaded ship at the station's factory meant putting in twenty-four to forty-eight hour stretches constructing barrels to hold oil and other whale products, but between ships there would be two or three days of relative leisure. As a young boy Walter J. Eyerdam had collected natural history specimens, including shells; this summer he spent his spare hours combing the beaches or operating a crude hand dredge from the back of a borrowed rowboat. In this way, he hauled up living specimens from both shallow shoals and rocky bottoms covered by 150 feet of water.

Born in Seattle in November, 1892, Eyerdam had been trained as a cooper.

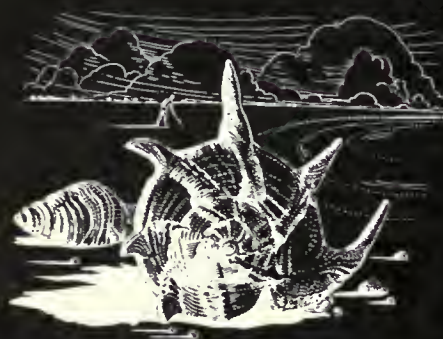
tion to be identified and stored the remainder in the growing number of wooden cabinets that housed his Alaskan collection. In 1919, he exchanged shells with Mrs. Oldroyd of Stanford University, and a young Michigan student, William J. Clench, who is now Curator of Mollusks at Harvard College. They were the first in a list of his correspondents that eventually numbered over two hundred.

Eyerdam's activities as a collector became widely known, and in 1927 he persuaded the United States National Museum and Thomas Barbour, the distinguished Harvard herpetologist, to send him to Haiti to collect both reptiles and shells. There he teamed up with Eric Ekman, a diligent and eccentric Swedish botanist, who taught him the art of plant

voyage ended, Eyerdam and Coultas persuaded the Soviet authorities to permit them to collect plants in Kamchatka from May to September. Their collection was then sold to the Riksmuseum in Stockholm. On their way to Moscow, Coultas and Eyerdam visited the local museum in Vladivostok and were greatly impressed by a mounted Siberian tiger. Returning to New York, they approached the American Museum about sponsoring a trip to collect Siberian tigers for the museum, only to learn that such an expedition had just left. They did, however, obtain jobs with the Whitney South Sea Expedition, and spent a year skinning birds in the Solomon Islands. As usual, Eyerdam collected many shells for himself.

Leaving the Whitney Expedition, he traveled from Singapore to Siberia, visited the famous Lake Baikal, continued west to Europe, where he married, and finally returned to Seattle in the early part of 1931. That summer, he again visited Alaska, collected plants for the Stockholm museum, fishes for the eminent Michigan ichthyologist, Carl Hubbs, and spent a few days each week on a herring boat. The next summer saw Eyerdam gathering plants in the Aleutians with the Swedish botanist, Eric Hultén. After the end of prohibition, the reopened breweries needed all the coopers they could get, and it was not until 1939 that Eyerdam made another collecting trip, this time to Chile, as a botanist for the University of California. During the decade of the 40's he wintered in Seattle ship yards as a steel chipper and summered in Alaskan herring stations as a cooper. Another plant collecting trip to Chile in 1957 and 1958 brings his travels up-to-date.

Twenty-four summers in Alaska had produced an unequaled collection of Alaskan shells. Moreover, during all his trips to Haiti, Siberia, the Solomon Islands, Europe, and Chile, Eyerdam had collected shells at every opportunity. Since 1919 he had traded duplicates from his collection with shell enthusiasts in all corners of the world. Japanese, Scandinavian, and Australian biologists studying deep sea shells exchanged species from their waters for Alaskan shells dredged by Eyerdam from a rowboat. Gradually his shell cabinets and ex-



PORTRAIT of a COLLECTOR

**By Alan Solem
Curator
Lower Invertebrates**

Influenced by an interest in natural history, however, he studied mining at the University of Washington, and followed this by three years as a prospector in California before making his Alaskan venture.

When the whaling station closed for the winter, Eyerdam returned to Seattle with a large assortment of shells. Many were sent to Dr. William Healy Dall and Dr. Paul Bartsch of the United States National Museum for identification, some named specimens being returned to the collector. In the following few years, Eyerdam continued to earn his living as a cooper for Alaskan whaling and herring stations, and to devote his spare time to shell collecting. Each year he sent a few to the Smithsonian Institu-

collecting. The success of this trip earned Eyerdam a \$200 bonus that enabled him to take a needed rest to recover from malaria and dengue fever.

The mountains of Kamchatka had been glimpsed from a fishing boat in 1925, and in 1928 Eyerdam seized an opportunity to become nursemaid to forty muskrats being shipped from Seattle to Siberia, where they were to be introduced to Karaginsk Island in hopes of establishing a fur industry. Two previous shipments of muskrats had died in transit, but Eyerdam and his partner, William Coultas, lost only one, presumably a patriotic animal, since it jumped overboard after escaping from its cage and was last seen swimming for the United States. When the thirty-six day

change packages filled the second floor of his house and spilled over to the first floor and basement. So many shells arrived that new packages could not be opened, since all available cabinet space was full.

So that he might continue to expand a collection that had greatly outgrown his storage facilities, Eyerdam recently agreed to sell his land and fresh water shells to Chicago Natural History Museum. In April of last year more than 58,000 specimens arrived at the Museum. Eyerdam's house still contains his more than 120,000 marine shells, with exchanges continuing and new boxes arriving weekly.

Today, a young sixty-nine, Walter Eyerdam is recognized not only as an expert collector, but as an authority on shells, mosses, and minerals. Numerous species have been named after him and his collections have formed, and will continue to form, the basis of many scientific monographs. Once or twice a month he still makes brief collecting trips around Seattle and nearly every week a lecture on some of his specimens or on his many travels is given to a Seattle group. He even talks of arranging a trip to a "stone age" area of New Guinea, to Amazonian Peru, or perhaps back to Siberia for more collecting. To keep in condition for such a trip, he continues as steel chipper in a ship yard.

Barrel cooper, bird skinner, steel chipper, prospector, lecturer, but above all, a great collector of natural history objects—this is Walter J. Eyerdam. His story gives a brief insight into what lies behind the bare announcement that "Chicago Natural History Museum has just received the very important collection of land and fresh water shells, containing about 58,000 specimens, that was formed by Walter J. Eyerdam of Seattle, Washington."

Perhaps ninety per cent of the molluscan specimens in Chicago Natural History Museum were collected by amateurs such as Eyerdam, and their efforts provide much of the raw material for our research studies. It is, therefore, most fitting that this announcement of the acquisition of a new collection should feature the man behind the specimens, rather than the specimens themselves.



Do you tend to think of museum scientific work in terms of high adventure on collecting expeditions to "faraway places with strange sounding names"? The lure of the exotic is apt to cause us to forget that important scientific discoveries may lie just beyond our doorstep.

On her way to work one late October morning, Mrs. Maidi Leibhardt, Museum artist, noticed an unusual number of small land snails—probably several hundred individuals—on the sidewalk in front of her apartment in Oak Park. Not all aggregations of snails are unusual, but this one was. For the species involved was *Cionella lubrica*, a form rarely known to occur in large numbers. There are only a half dozen scattered references in the literature, dating back to the early 1840's, which record such concentrations of *C. lubrica* as were observed by Mrs. Leibhardt.

The detailed environmental circumstances (temperature and other weather conditions) at the time of her first observation were obtained from Mrs. Leibhardt, and she continued watching the site until cold weather drove the snails into hibernation. This information has now been summarized and compared with the meager data given in previous reports. Are these concentrations a response to local weather conditions, a reflection of periodic population build-ups, or reproductive aggregations? We do not have enough data to go beyond the formulation of working hypotheses. As other isolated observations are made known (and we hope the publication of this one will stimulate them) our store of knowledge will build up. Eventually we will have sufficient information on which to base some firm conclusions. Had it not been for an alert layman, the Oak Park snail concentration, although close at hand, would probably have entirely escaped scientific notice.

A second instance of a significant

discovery made close to home also occurred last year. In late June, Miss Joanne L. Evenson, of the Raymond Foundation, picked up for her aquarium several aquatic snails from a lake near Madison, Wisconsin. Within a few days the snails died. They were identified as *Viviparus contectoides*, a gill-breathing snail, previously known from Wisconsin only by a single "dead" shell found in the 1920's in a stream near Milwaukee. In July, Miss Evenson found this species at yet another Wisconsin locality, and she continues the search for additional material as opportunity affords.

Miss Evenson's specimens are being placed at the disposal of Dr. William J. Clench, Curator of Mollusks at the Museum of Comparative Zoology, Harvard College, for use in connection with a monograph he is preparing on the group. He and other malacologists are interested in ascertaining the extent of the range of this snail in Wisconsin. If, as now appears possible, it is fairly widespread over that state, why has it been almost completely overlooked until now? Has it recently spread northward from Illinois, where it is fairly common? Or have we merely failed to look in the right places? As is common in scientific work, a single discovery has opened up several questions.

These two cases serve to illustrate one of the things that makes museum work interesting. We never know when someone will bring or send in specimens that will prove to be of more than average scientific interest. Of course, only a small percentage of such cases will have exceptional merit. But the average person, if he is curious about everything he observes, and tries to find out what is already known about his observations, may well have the satisfaction, as have Mrs. Leibhardt and Miss Evenson, of helping to lay another brick in the edifice of science.



The Bird Watcher's Guide

By Henry Hill Collins, Jr. Golden Press:
New York. 123 pages. \$3.95.

This is a once-over-lightly, how-to-do-it book that tells how to build an active, sporting hobby around birds. Pleasantly written, easy to read, its 22 chapters cover the following: becoming a bird watcher, equipment, first steps; identification (five pages); how, where and when to see birds; trips for birds; the sport, lists, censuses; houses, baths, cover and planting for birds; photographing, banding, conserving birds; bird clubs (including lists of) and a set of selected references. The chapter on the sport of bird watching covers the following topics: "Big day," "Big morning," "Small day," "Round up," and "Rare bird alert."

As nearly half of the 123 pages is taken up with illustrations, some of them excellent color photographs, some informative art work, and some patches of garish color, the text is skimpy. This makes necessary a reference to one of the publications listed in the back, to locate a book where an adequate coverage can be found.

A. L. RAND
Chief Curator of Zoology

The Giant Snakes

By Clifford H. Pope. Alfred A. Knopf:
New York. 290 pages, 25 photographs.
\$6.95.

Probably no one else is as qualified as Clifford Pope to write this book. The Museum's former Curator of Reptiles kept an Indian python named Sylvia from the time it was an infant scarcely three feet long until it was ten feet, nine inches long five years later. As Sylvia lived most of this time in Mr. Pope's home, the observations on growth, physiology, and behavior made by Pope were detailed and supplied the impetus for this book.

Sylvia's presence also supplied the impetus for many stories, true and untrue, in the suburb of Winnetka. Neighbors gradually became accustomed to

the occasionally strange habits of museum curators. The Village of Winnetka took all ten feet of Sylvia in stride and merely noted on the Popes' card in the official files: "Snake in basement," for the benefit of water meter readers.

In this book Pope has brought together all that is known of the biology and habits of the six giant constricting snakes: the boa constrictor, the Indian python, the amethystine python, the African rock python, the reticulated python, and the anaconda. The subjects covered include senses, locomotion, strength, food, growth, reproduction, and relations to man. Information on these snakes is buried in hundreds of scientific papers, and it took Mr. and Mrs. Pope years of digging in libraries to assemble it all.

Some of the information on the giant snakes can be understood only in terms of the biology of snakes in general. For this reason Pope has presented a remarkably complete and concise summary of this larger subject.

The writing has Pope's customary clear style. While fascinating to adult readers, the book can be read and understood by an intelligent twelve-year-old. I read this book with eagerness and I can imagine that I would have done the same if it had been available when I was in seventh grade.

ROBERT F. INGER
Curator of Reptiles and Amphibians

Chicago Area Archaeology: Bulletin No. 3, Illinois Archaeology Survey, Inc.

Edited by Elaine A. Bluhm. University of Illinois: Urbana. 175 pages, 81 illustrations. \$2.00.

Following are the contents of the Illinois Archaeological Survey's most recent publication:

- "An Archaeological Survey of the DuPage River Drainage," by Sanford H. Gates
- "Evidence for an Archaic Tradition in the Chicago Area," by Philip D. Young
- "Report on a Back Yard Digging," by Jane MacRae

- "Two Early Burial Sites in Lake County," by Philip D. Young, David J. Wenner, Jr., and Elaine A. Bluhm
- "The Skeleton from the Doetsch Site, Lake County, Illinois," by Georg K. Neumann
- "Old Copper Artifacts from Chicago," by George I. Quimby
- "The Bowmanville Site," by Gloria J. Fenner
- "The Adler Mound Group, Will County, Illinois," by Howard D. Winters
- "The Anker Site," by Elaine A. Bluhm and Allen Liss
- "The Oak Forest Site," by Elaine A. Bluhm and Gloria J. Fenner
- "Indians of the Chicago Area ca. 1650 to 1816," by Emily J. Blasingham

These eleven papers, two of which are by staff members of the Museum's Department of Anthropology, summarize the results of recent study, survey, and excavation of Chicago-area archaeological sites, and review the ethno-history of the area. Included in the papers are reports of work sponsored and carried out by Chicago Natural History Museum, the University of Illinois, and the Illinois Archaeological Survey.

Bulletin No. 3 can be read with interest by many throughout the Chicago region and neighboring areas, not only for the information it contains, but for



"Gentian Trio" by Fred E. Unverhau, Danbury, Connecticut. A top medal winner in the 17th Chicago International Exhibition of Nature Photography presented at the Museum in February.

the way it points up the archaeological losses we have sustained in these areas and the critical nature of the sites that are left in northeastern Illinois.

ALLEN S. LISS
Department of Anthropology





"The relation of the Chinese to crickets and other insects is one of their most striking characteristics, and presents a most curious chapter in culture-historical development."

SO WROTE Berthold Laufer,¹ distinguished anthropologist and former Curator of Anthropology, who conducted pioneering expeditions to China and Tibet for the Museum during the early 1900's. According to Dr. Laufer, the reason that the Chinese affinity for insects—and particularly crickets—is so interesting to anthropologists is that it represents a curious exception to a universal rule concerning man's relation to animals. In the primitive stages of life man took a keen interest in the animal world, observing and studying large mammals first, and birds and fishes next. But the Chinese were more concerned with insects than with any other animals; and mammals attracted their

Cricket Warriors and Musicians of China

attention least of all.

As a result, the Chinese have made discoveries and observations about insects which still inspire admiration. The life cycle of the cicada, for example, one of nature's most puzzling phenomena, was known to the Chinese centuries ago. More significantly, only a people with a deep interest in nature's smallest creatures could have penetrated the mysterious habits of an insignificant caterpillar to present the world with the discovery of silk.

Perhaps the most intriguing aspect of

this national predilection for insects is in the areas of sports and entertainment. While sports enthusiasts in other parts of the world have focused their attention on baseball diamonds, football fields, bull-fight rings, and gigantic soccer stadiums, the Chinese sports fan has been concerned with a tiny pottery jar, the arena for the most unusual of spectator sports—cricket fighting.

For anyone who might find it difficult to imagine a bout between crickets, the following description by Laufer sheds light on this uncommon sports event.



"The tournaments take place in an open space, on a public square, or in a special house termed 'Autumn Amusements'. There are heavy-weight, middle, and light-weight champions. The wranglers are always matched on equal terms according to size, weight, and color, and are carefully weighed on a pair of wee scales at the opening of each contest. A silk cover is spread over a table on which are placed the pottery jars containing the warring crickets. The jar is the arena in which the prize fight is staged. As a rule, the two adversaries facing each other will first endeavor to flee, but the thick walls of the bowl or jar are set up as an invincible barrier to this attempt at desertion.

"Now the referee, who is called 'Army Commander' or 'Director of Battle' intercedes, announcing the contestants and reciting the history of their past performances, and spurs the two parties on to combat. . . . The two opponents, thus excited, stretch out their antennae, which the Chinese not inaptly designate 'tweezers,' and jump at each other's heads. The antennae, or tentacles, are their chief weapons. One of the belligerents will soon lose one of its horns, while the other may retort by tearing off one of the enemy's legs. The two combatants become more and more exasperated and fight each other mercilessly. The struggle usually ends in the death of one of them, and it occurs not infrequently that the more agile or stronger one pounces with its whole weight upon the body of its opponent, severing its head completely."

The period before the matches is one of rigid adherence to a number of training procedures. Trainers are aware, for example, that extremes of temperature are injurious to crickets. Therefore, when they observe that the tiny antennae of the insects are drooping, they conclude that their charges are too warm. The temperature is then adjusted, the cricket being protected at all times from drafts. When a trainer judges that a cricket is sick from overeating, a change of diet to

a certain kind of red insect is prescribed. If sickness arises from cold, a diet of mosquitoes is the remedy; if from heat, young green pea shoots are given. A kind of butterfly, known as the "bamboo butterfly," is the prescription for difficulty in breathing.

Even in death the cricket enjoys special attention. In southern China, when a cricket champion dies it is placed in a small silver coffin and solemnly buried. The owner believes that showing such respect will bring him an excellent harvest of fighters next year, when he searches the area of the burial. These ideas spring from the belief that able cricket champions are incarnations of great warriors and heroes of the past, from whom they inherit a soul imbued with special prowess.

This month's BULLETIN cover shows a scene from an old Chinese scroll painting in the Museum's collection. The painting depicts the games and pastimes of boys—including the three youngsters peering intently at a wooden cricket cage (like the one in the photograph on page 2) which undoubtedly houses the local champion. Such cages are only one of many objects devised by the Chinese for the comfort and housing of pet crickets.

For example, there are cricket traps—often marvelous works of art—made of bamboo or ivory rods. Circular pottery jars of common burnt clay with a perforated lid house the insects during the summer (many potters are proud of their specialization in cricket houses and impress on them a seal with the maker's name). Tiny porcelain dishes decorated in blue and white hold the insects' food and water. Beds and sleeping boxes are fashioned of clay. During the winter months, the crickets are transferred to homes made from gourds, furnished with cotton padding beds. These cages are shaped by the ingenious method of introducing the young gourd into an earthen mold, so that as the gourd grows it assumes the shape of the mold and is

permanently imprinted with its designs. Such a cage is pictured on page 2.

Of special interest in the long list of cricket equipment are the ticklers used for stirring the insects to fight or sing. In Peking fine hairs from a hare or rat whiskers inserted in a reed or bone handle are used for tickling; in Shanghai, a delicate blade of grass. Ticklers are kept in bamboo or wooden tubes, with elegant ivory containers being reserved for the rich.

An aspect of cricket enjoyment that we cannot omit in this discussion has to do with the insect's best-known characteristic—its melodious chirping. A 6th Century Chinese book, *T'ien-pao i-shih*, describes the origin of a charming custom:

"When the autumnal season arrives, the ladies of the palace catch crickets in small golden cages. These with the cricket enclosed in them they place near their pillows, and during the night hearken to the voices of the insects. This custom was imitated by all people."

Instead of using golden cages, however, ordinary people placed their crickets in bamboo or wooden cages—or even in a carved walnut shell—and carried them tucked inside their dress or suspended from their girdles.

Of course, the cricket's chip has had its place in Western society as well. While some have interpreted the notes of the hidden melodist as a portent of sorrow, or even an omen of death, in England the insect's cheerful notes generally have suggested peace and comfort, and the coziness of the homely fireplace.

This July—and for several months to come—when the evening countryside is alive with a chorus of cricket voices, it is hoped that the preceding will provide our readers with a new dimension in their enjoyment of the summer night.

¹ Laufer, Berthold, *Insect Musicians and Cricket Champions of China*, Anthropology Leaflet 22, Chicago Natural History Museum.

New
Chief
Curator

Dr. Rainer Zangerl was appointed Chief Curator of the Department of Geology of Chicago Natural History Museum at the last meeting of the Board of Trustees. His predecessor in the post was Dr. Sharat K. Roy, who died on April 17.

Dr. Zangerl has been Curator of Fossil Reptiles at the Museum since 1945, when he joined the Museum's scientific staff. Before that he had held positions at the University of Notre Dame, the University of Detroit, and Middlesex University in Waltham, Massachusetts. He was born in 1912 in Switzerland, and obtained his formal education in that country, receiving a doctorate in philosophy from the University of Zurich in 1936.

While a member of the Museum's staff, Dr. Zangerl has been actively engaged in research in the field of fossil reptiles. This scientific interest has led him on expeditions to many parts of the United States and Europe. Most recently, he and Dr. Eugene S. Richardson, Curator of Fossil Invertebrates, have focused their attention on the Mecca area of Indiana, a region once covered by a large epicontinental sea. The faunas that they have collected from the Mecca and Logan quarries are estimated to have lived 240 million years ago. Through study of these faunas and of sediments from the quarries, Drs. Zangerl and Richardson have reconstructed the events that occurred in the Mecca area during two specific four-year periods of prehistory.

Dr. Zangerl has published the results of his research in numerous scientific journals and has contributed lead arti-

cles to several encyclopedias. He is a member of the Society of Vertebrate Paleontology; the Detroit Academy of Sciences; the American Association of University Professors; and the Schweizerische Paleontologische Gesellschaft.

In
Memoriam

The Museum has been saddened by the death of Mrs. Sara Carroll Field, Museum benefactor and wife of Stanley Field, Chairman of the Board of Trustees. Mrs. Field died on June 1 after a period of prolonged illness. She was 84 years of age. Her life-long interest in the Museum and a number of charitable organizations, and her active participation in Chicago's civic and social life will be deeply missed.

Children's
Summer
Programs

A puppet stage production, "The Three Bears Take to the Wilderness," opens Chicago Natural History Museum's summer series of free children's programs on July 5. The programs will be presented every Thursday morning through August 9, at 10 A.M. and 11 A.M., in the James Simpson Theatre. On July 5, the delightful puppets created by the Apple Tree Workshop, of Chicago Heights, will enact a story based on what might happen if the traditional three bears lived in a modern city and suddenly decided to go back to the wilderness.

On the other dates of the summer series, color movies about nature and science have been scheduled. They are: July 12—"Australia's Coral Wonderland"; July 19—"African Lion" (A Disney "True-Life Adventure"); July 26—"Summer Adventure in the Out-of-Doors"; August 2—"Seldom-Seen Animals"; August 9—"Universe."

The free programs are selected by the Museum's educational division, the Raymond Foundation. Adults are welcome to attend with their children.

Chicago Natural History Museum

Founded by Marshall Field, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
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Members are requested to inform the Museum promptly of changes of address.

Tutankhamun
Treasures
Close July 15

Since their opening on June 15 the King Tutankhamun Treasures have attracted to the Museum thousands of visitors from all over the Midwest. In the first two weeks of exhibition more than 43,000 persons saw the treasures. Because of this unusual public response—and so that the treasures may be enjoyed to the fullest degree—visitors who have not seen the exhibit are advised to come during the late afternoon, or evenings on those days when the Museum is open until 8 P.M. Those evenings are Wednesday, Friday, Saturday, and Sunday, nights of the free Grant Park Concert presented in the bandshell across the street from the Museum. The treasures will remain on display here in Chicago only until July 15.



Rainer Zangerl



Joseph Curtis Moore

Curator of Mammals

SCIENTIFIC RARITIES FROM CEYLON

A SHIPMENT of mammal specimens, which includes species that are very rare in the great scientific collections of the world, has recently arrived at the Museum from tropical Ceylon. In wooden boxes tightly covered with white muslin, addressed with paint, and adorned with sealing wax and numerous attractive postage stamps, the collection certainly arrived in a style suited to its significance.

From these distinguished parcels the Museum has received its first two specimens of a species of bat called *Kerivoula picta*, the painted bat. Like the more familiar red bat of North America, the painted bat from Ceylon wears a bright coat of orange-red hair, which becomes more brilliantly orange to scarlet along its wings and contrasts with large patches of dark pigment on the flying membrane. In painted bats from some geographic areas these darkly pigmented patches may in life be iridescent.

One might think that a curator who routinely receives study skins of mammals from far parts of the world would become indifferent to any beauty in them. But not so. When a curator of mammals mentions his examples of the painted bat, his appreciation of their charm will noticeably warm both his choice of words and tone of voice. It may seem somehow appropriate that so especially attractive a species lives in those alluring Oriental countries, Indonesia, Ceylon, Malaya, and Thailand.

No one knows much about the painted bat. It is said to be rather solitary and to live in tropical jungle where it sleeps by day, probably hanging from some vine like a dead and withered leaf. Major S. S. Flower, the English naturalist, said that he found one in Thailand asleep "in the flower of a Calla lily." The two obtained by Chicago Natural History Museum were captured in sugar cane.

Another species new to the Museum's collections and received in this distinctive shipment from Ceylon is the rusty-spotted cat, *Felis rubiginosa*. Smaller than the domestic house cat, the rusty-spotted cat is said to be active and courageous, and has some reputation for raiding chicken houses located near jungle. The Museum's new specimen came from rain forest in the central highlands of Ceylon. Although there are four species of cats occurring on Ceylon, the rusty-spotted variety is the smallest, and the only one restricted in range to Ceylon and southern India. The other three species all range widely in southern Asia.

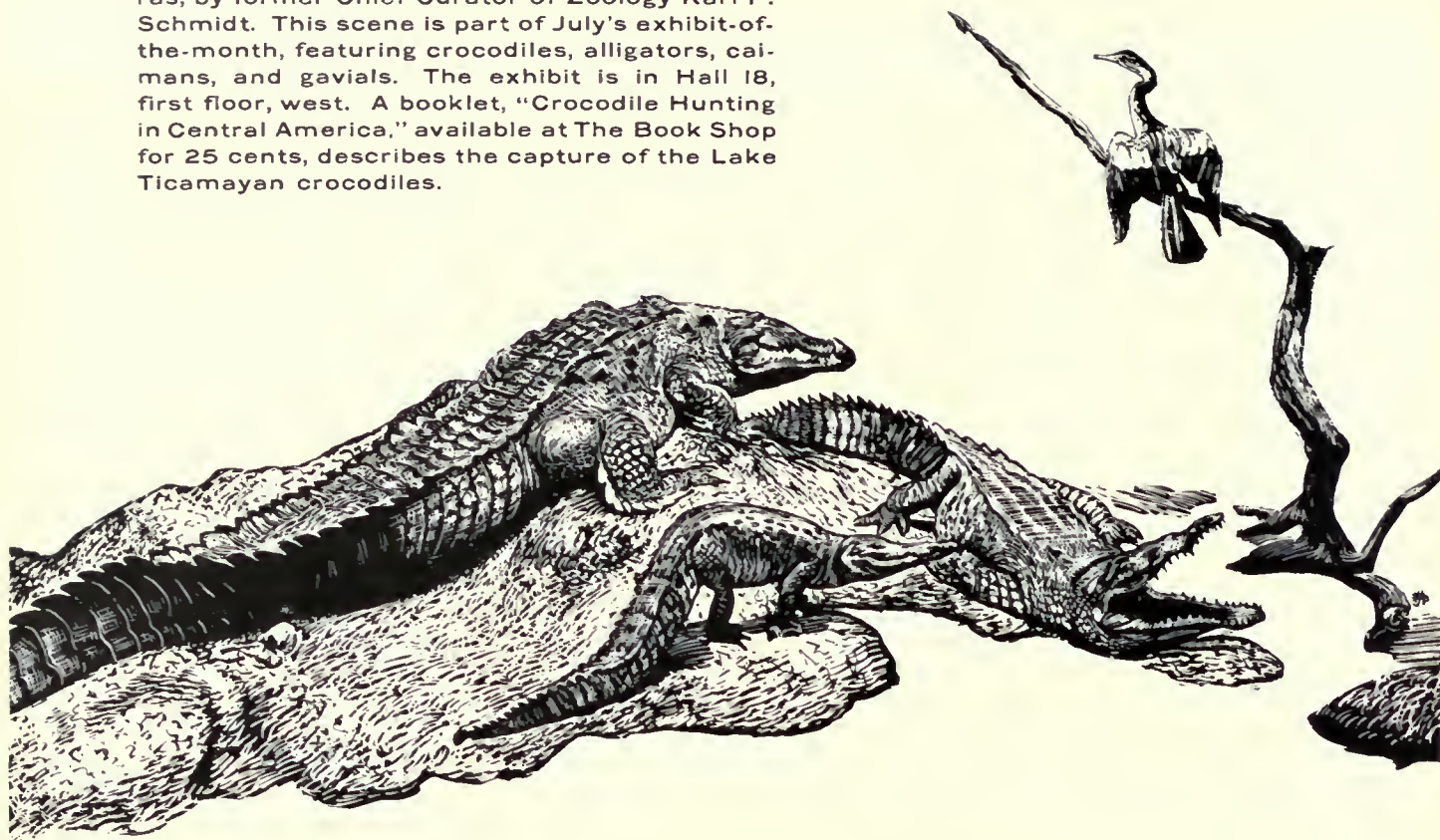
From the white muslin packages, also, has come the Museum's very first specimen of the ruddy mongoose, a species known only from central and southern India and Ceylon. This particular mongoose, *Herpestes smithi*, lives primarily in jungle where it preys upon birds, small mammals, and reptiles. In Ceylon it is said to feed extensively upon the giant terrestrial snail of Africa, *Achatina fulica*, which was foolishly introduced into Ceylon in 1900 and quickly became a destructive garden pest. Naturalists record that the ruddy mongoose breaks open the thick shell of this big mollusk by beating it upon a stone, and that one may find a number of such broken shells scattered about a conveniently protruding rock, some split neatly in half down the middle. In addition to this kind of virtuosity, the ruddy mongoose is reported to have the temerity to feed upon the kill of a leopard, though it departs in utter panic upon sensing the return of the cat.

While there are four species of mongoose in Ceylon, one may distinguish the ruddy mongoose in the field by its curious habit of carrying its long tail with the tip curved up.

A second species of mongoose proves also entirely new to the Museum's collections. This is the mongoose with the striped neck, *Herpestes vitticollis*—the largest of all the eleven species in Asia.

(Continued on page 8)

Drawing of a habitat group showing American crocodiles captured in Lake Ticamaya, Honduras, by former Chief Curator of Zoology Karl P. Schmidt. This scene is part of July's exhibit-of-the-month, featuring crocodiles, alligators, caimans, and gavials. The exhibit is in Hall 18, first floor, west. A booklet, "Crocodile Hunting in Central America," available at The Book Shop for 25 cents, describes the capture of the Lake Ticamayan crocodiles.



THE NILE CROCODILE

Paula R. Nelson

The unforgettably sly crocodile who - - In Lewis Carroll's famous lines - - "... welcomes little fishes in with gently smiling jaws," is the heritage of all English-speaking children. From Pliny's carefully recorded observations to Rubens' boldly imaginative "Hippopotamus and Crocodile Hunt," studies of this survivor of the Age of Reptiles have exerted a unique fascination. A recent publication on the Nile crocodile by Dr. Hugh B. Cott of the University Museum of Zoology, Cambridge,¹ is the most complete, modern report of this remarkable animal. The following article is based on Dr. Cott's research.

IN THE WARM, unruffled waters that it normally frequents, the Nile crocodile floats low. Little more than its snout tip, eyes, and the back of its head are above the surface. At an alarm, the animal closes its nostrils and immediately dives to the muddy bottom. There it may remain, fully submerged, for as long as an hour.

The pebbles and stones that the crocodile has swallowed during its lifetime,

and which may account for as much as one per cent of its total body weight, help to keep it submerged in places where a strong current might dislodge an animal of lower specific gravity. These stomach stones also have an effect like the cargo in a ship's hold: they help to stabilize the swimming animal. The need for such a mechanism becomes apparent when young crocodiles that have not yet begun to accumulate stomach

stones are placed in deep water. Tail-heavy and top-heavy, they cannot lie level at the surface like their stone-carrying elders, but must move their limbs to keep from rolling about. This is in marked contrast to the easy poise of the floating adult.

Nights are usually spent in the warmth-retaining waters, which are sought again by the cold-blooded reptile during the intense heat of the next day's noon.

Mornings and afternoons the crocodile shares his basking and breeding grounds at the edge of the water with a large number of different kinds of birds. From the times of Herodotus and Pliny, it has been known that certain birds feed from the crocodile's body. The food taken is tsetse flies and leeches. In addition to ridding the reptiles of these parasites, the birds give timely warning of danger. Basking crocodiles will respond immediately to the alarm signals of birds that become aware of an approaching man or boat before their sleeping companions.

Under modern conditions of intensive hunting, few crocodiles achieve their potential life-span, though individuals in captivity have been known to live for from 20 to 50 years. Studies of the growth rates of these animals suggest that a crocodile measuring 15 feet in length would be about 76 years old, and one measuring 18 feet would be over 100 years old. If, as is believed, the growth rate slows down in later life, then the largest known specimens must have survived well into their second century.

At different periods of their life-history, crocodiles utter a variety of sounds. There is the croaking of the young while still in the egg; the sharp, coughing hiss of the cornered reptile unable to make its escape to water; the warning growl of the female surprised while guarding her eggs; and the powerful, open-jawed roaring of the male during the breeding season.

As in many tropical animals, the reproductive cycle of the Nile crocodile is correlated with the seasonal rhythm of rainfall. The eggs are laid in the dry season, in holes dug in coarse sand or gravel near the water's edge. The incubation period coincides with the phase of lowest water; and hatching occurs after the onset of rains, when the lakes and rivers are again rising into flood. These are ideal conditions for the newly-emerged young, who disperse upon the wide-spreading shallows, feeding upon the rich harvest of insects that follows the rains.

Among the weedy shallows, in isolated pools, occasionally at some distance inland, and even on nearby tree limbs, the young crocodiles from two to five years old lead a life of seclusion. So

successful are they in keeping out of sight, shunning both the common basking grounds and the open water, that many observers report the young animals have "vanished." Since these reptiles have few enemies other than larger individuals of their own kind, the segregation of the young from their elders is probably forced upon them by the prevalence of cannibalism.

Young crocodiles feed on insects, snails, crabs, frogs, and toads. As the reptiles grow, fish, mammals, and other crocodiles become the important foods. Occasionally birds and lizards are taken. The hunting and capturing of prey is characterized by stealth, surprise, and a final, sudden burst of speed. The adult crocodile often lurks off-shore near game trails and watering places. On sighting an animal that has come down to drink, the reptile quietly submerges and cruises under water to the precise spot from which it can make its fatal upward rush. A sideways snap of the jaws, and the prey is seized, dragged down into the water, and drowned. When feeding ashore, the crocodile may lie in ambush near trails or beside dried-up water courses. It is here that the deadly tail-stroke or sledge-hammer head-blow effectively throws the victim, breaks its leg, or flings it into the water.

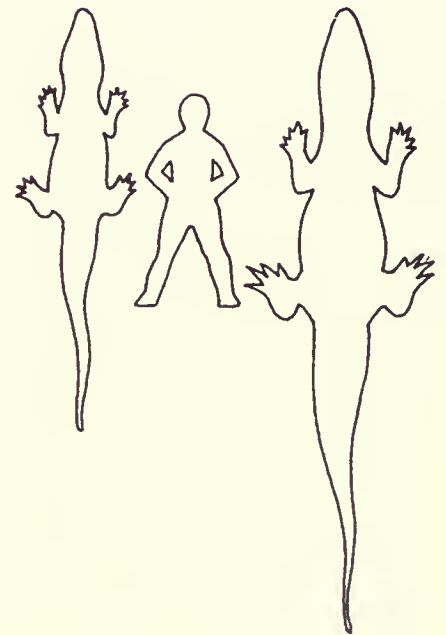
The only animals known to kill the adult Nile crocodile are the hippopotamus, lion, leopard, African elephant—and man. In recent years, the trade in crocodile leather has grown to the proportions of almost a major industry. As a result of this commercial exploitation, in some areas of the world the crocodile is being rapidly reduced and its continued existence actually threatened.

Yet from the points of view of ecology, economics, and zoology, this animal is a valuable and important member of its local fauna. For example, the Nile crocodile is directly or indirectly beneficial to the fishing industry of East and Central Africa, since the reptiles feed upon species that prey upon fry, while eating relatively few adult fish themselves. As a producer of high-quality leather, the crocodile is a commercial asset, and under rational management could provide a sustained yield of skins. More important still, to the biologist these animals merit protection

in their own right. Crocodiles essentially like the modern species existed in Jurassic times, and were contemporaries of the dinosaurs. As the only members of the archosaurian stock which survived beyond the Age of Reptiles, they are of exceptional scientific importance. Studies of their anatomy, physiology, ecology, and behavior can throw indirect light upon the biology of ancestors long extinct.

For these reasons, it is to be hoped that the crocodile—which has survived over a hundred million years—may continue to live as a unique and valuable member of the tropical fauna.

This drawing from July's featured exhibit shows the relative sizes of living species of crocodile and man. The exhibit explains how to tell a crocodile from an alligator and shows how the crocodile's build is especially adapted for life in the water. An American alligator is shown with her nest and eggs, along with the skull of a 15-foot man-eater from the Philippines.



¹ Cott, Hugh B., "Scientific Results of an Inquiry into the Ecology and Economic Status of the Nile Crocodile (*Crocodilus niloticus*) in Uganda and Northern Rhodesia." *Transactions of the Zoological Society of London*, Vol. 29, Part 4, April, 1961.

STAFF NOTES

Harry E. Changnon, Curator of Geology Exhibits, conducted a lecture and laboratory exercise at the Chicago Academy of Science on the identification of minerals, for teachers and students of the Chicago area.

Dr. Donald Collier, Curator of South American Archaeology and Ethnology, has been appointed a member of the International Committee of the *Centre International d'Etude Ethnographique de la Maison dans le Monde*, in Brussels. The Committee will study the domestic architecture of the world from a cultural and anthropological point of view, to determine the relation of each country's housing to its physical environment and social organization.

"Archaeological Exploration in New Mexico" was discussed by Allen Liss, Custodian of Collections, Department of Anthropology, at a recent meeting of the Earth Science Club of Northern, Illinois.

Dr. Paul S. Martin, Chief Curator of Anthropology, and Mr. George Quimby, Curator of North American Archaeology and Ethnology, attended the annual meetings of the Society for American Archaeology at Tucson. Mr. Quimby was chairman of a session on the archaeology of the eastern United States, while Dr. Martin chaired a session on southwestern archaeology.

Mr. George Quimby, Curator of North American Archaeology and Ethnology, has been appointed Collaborator of the National Park Service, Region One. In this consultative capacity, he recently inspected salvage archaeological operations at Ocmulgee National Monument, Georgia.

Mr. E. Leland Webber, Director, attended the Conference of Directors of Systematic Collections held in Washington, D. C., in March.

Loren P. Woods, Curator of Fishes, and Robert F. Inger, Curator of Amphibians and Reptiles, traveled to Washington, D. C., last month to attend the 42nd Annual Meeting of the American Society of Ichthyologists and Herpetologists. Both are members of the society's board of governors and Dr. Inger is herpetological editor of its quarterly publication, *Copeia*.



Sea Shells of the World

A Golden Nature Guide, by R. Tucker Abbott. Golden Press: New York. In de luxe hard cover library edition, \$3.50; limp-bound edition, \$1.00.

There are many books dealing with the better-known and more spectacular sea shells of the world to which the interested layman or collector resorts for information. These books have two disadvantages: they are bulky and expensive. Now there is a recently published booklet on the same subject which overcomes the two handicaps mentioned above: it is of pocket-size, and is very, almost incredibly, inexpensive, costing just one dollar! As far as the contents of this recent booklet are concerned, they hold to what is promised in the title. The selection of shells is good and the accompanying figures in color are as useful as anyone could wish. Hence one really can recommend Abbott's new publication wholeheartedly, and hope that it will get the vast distribution that it deserves.

FRITZ HAAS

Curator Emeritus, Lower Invertebrates

Drawings for this month's Bulletin by Museum Artist, E. John Pfiffner. Photographs by the Division of Photography.

CEYLON RARITIES

(Continued from page 5)

The geographic range of *Herpestes vitticollis*, like that of the brown mongoose, *H. fuscus*, extends only up into the southern tip of India, and is thus exceedingly small. It may seem a curious thing that two mongoose species out of the four known to inhabit Ceylon should be so limited in distribution. However, the Western Ghats (mountains) of southern India and the Central Highlands of Ceylon receive torrential rains from the southwest monsoons which support the lush tropical rain forest that is rare in most of the rest of India. Such tropical rain forests appear to provide a proliferation of niches for similar species in many genera of animals. To cite another example besides the mongoose, there are three species of the diurnal tree squirrel genus, *Funambulus*, whose ranges are all limited to this same area.

How such a proliferation of similar species may have come about is a question that invites speculation. I have published one hypothesis seeking to explain the origin of the species of squirrels local to Ceylon and southern India, in which I suggest that the simple mechanism involved is the presumed union of Ceylon with the mainland during each glacial period of the Pleistocene, and the separation of Ceylon from the mainland during each interglacial period. (Ceylon and peninsular India have been physiographically very stable, and the lower and higher sea levels of glacial and interglacial periods should obviously have accomplished the unions and separations mentioned.) Each union would permit mainland species to invade Ceylon; each separation might be long enough to allow island and mainland populations of any one species to evolve differences that would prevent their interbreeding when rejoined at the beginning of the next union. These pairs of populations would survive as distinct species if they evolved habits that would enable them to avoid competition with one another. Very likely the mongoose with the striped neck, the brown mongoose, and even the ruddy mongoose originated in this way.



CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

Vol. 33

No. 8

August

1962

BATS

and their Menus



"I could distinguish large bats swooping about as they out-manuevered the fireflies and picked them off in flight."

BATS are world-wide in distribution, but in the tropics they are most numerous and diversified. The warm nights are filled with the soft beat of their wings, the clicking and rasping sounds of their voices, and the constant patter of falling seeds, fruits, and flowers dropped from their feedings. On bright nights when no other animal may be visible, bats can be seen as flitting shadows climbing, diving, turning, skimming over moonlit waters and careening high above the tree tops.

All bats of temperate latitudes are insect eaters, and during the winter they must migrate or hibernate. Not so in the tropics, where there is an abundance of flowers and fruits the year round. Insect eaters live there, too—many more

kinds than in northern latitudes—and there are meat eaters, fish eaters, blood suckers, and others with more general tastes.

Insectivorous bats may see or hear their prey, but their usual manner of hunting and navigating, in general, is by echolocation. Bats send out high pitched signals and determine the direction, distance and perhaps the nature of objects by the echoes received. By this means bats flying at comparatively high speed in pitch darkness can avoid obstacles and capture insects with amazing rapidity, up to one and even two per second. Echolocating sounds emitted by bats, particularly those of the larger insect-or fish-catching species, are often audible to the human ear. The sounds made by

smaller bats, however, are usually higher and outside our range of hearing. Bats also have a repertory of quite audible squeaks, chirps, hisses and screams for expressing feelings and communicating with other bats.

Insect-eating bats usually catch prey in mid-air with their wing or tail membrane before seizing it with their mouth. An insect too large to be devoured in flight is carried to a feeding place where the bat hangs head down and eats at leisure. A bat feeding roost can be recognized by the piled-up leftovers of wings, legs and other hard parts of insects. The daytime resting roost, in contrast, is in a dark, well sheltered place marked by the accumulation of guano.

One memorable evening in a tropical forest, just as the calls of the tinamous and wood quails died out, I saw a myriad of fireflies scatter out of the trees like bursts of stars. I watched the light of one of the beetles flying straight toward me, then suddenly swerve into a wild, careening flight and abruptly disappear from sight. Then another and another of the drifting lights broke into a swift, zigzagging flight and vanished in mid-air; meanwhile I could distinguish the silhouettes of large bats swooping about and feel the beat of their wings and hear the crunch of their jaws as they out-manuevered the fireflies and picked them off in flight. The evasive flight tactics of the fireflies prompts the thought that they, too, and perhaps many other insects, possess a sound wave system for warning them of the approach of predators just as bats use their system for detecting prey.

Fruit eaters can find their stationary food by sight or smell and they use their echolocating system in flight for avoiding obstacles. Only ripe, fragrant fruits



"Most nectar and pollen eaters have long noses and extensible, brush-tipped tongues which can be protruded into the floral envelope."

attract these bats and wild figs are a favorite as well as a common food in the forest. Ripe bananas in orchards or stores are irresistible.

A large number of bats feed on the nectar, pollen, petals and other parts of night flowers. Most nectar and pollen eaters have long noses and marvelously long, extensible, brush-tipped tongues which can be protruded into the floral envelope. Small bats which cannot reach the pollen or nectar of pitcher-shaped flowers from the outside crawl inside as far as need be to get their food. By their various operations in feeding on flowers, bats become pollinating agents and there are night-blooming flowers specially adapted for attracting and feeding bats to insure pollination.

Of the nearly 2,000 kinds of bats known to science only two are proven fish-catchers. One, the hair-lipped bat, or *Noctilio*, widely distributed over tropical America, is about the size of a robin. The other, with the technical name, *Pizonyx*, is smaller and restricted to the coasts and islands of northwestern Mexico. *Pizonyx* is rarely observed and has never been identified in the act of fishing, but the stomachs of captured individuals always contain fish. On the other hand, *Noctilio* is common and easily recognized by its comparatively large size, bright reddish-orange color and a pervading scent not unlike some popular perfumes. The bat is often seen before nightfall skimming over water.

The dim, fading light and the swift, unpredictable movements of the bat make it impossible to see how *Noctilio* catches fish. In an experiment recently conducted with special cameras on captive *Noctilio*, it was ascertained that the

bat drags its large feet through the water and hooks whatever small fish may be near the surface with its long, sharp, recurved claws. *Noctilio* may actually see the particular fish it tries to gaff or it may hook it by chance. *Noctilio* also catches and eats insects over water and far from water and it may live indefinitely on insects alone.

The omnivorous bats are primarily insectivorous, but also prey on other bats and small, nocturnal vertebrates such as frogs, lizards, mice and whatever roosting birds they can kill. Large insects, including beetles, moths, and larvae, are favorite articles of diet, and fruits, particularly bananas, are eaten along with the insects and small animals feeding on them. The largest New World bat, the so-called false vampire, is an omnivore. Its body is about the size of a large rat and its wingspread exceeds three feet. It hawks in wide, smooth circles with an unhurried stroke of the wings. The clicking or echolocating sound made by this bat is loud and rasping. The prey is trapped with the wings and seized with a crunching bite behind the neck.

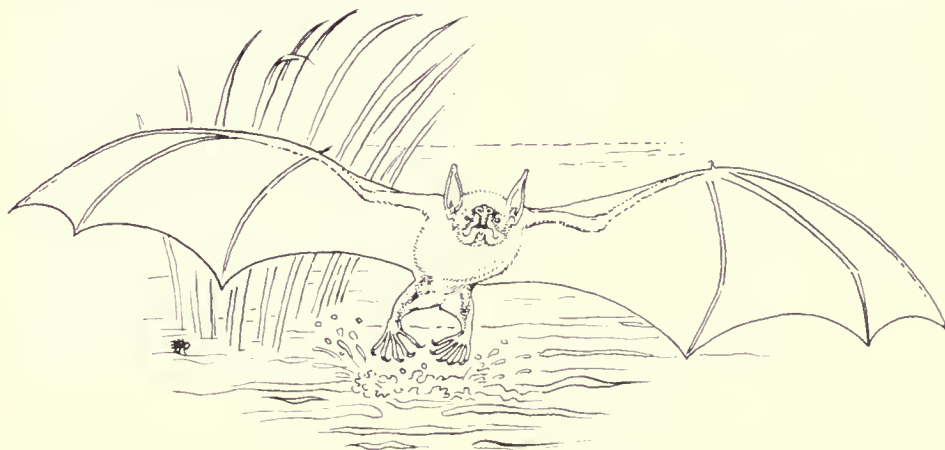
True vampire or blood-sucking bats are confined to the New World tropics. There are three kinds, all the size of a mouse. *Desmodus* is the common, widespread species found almost everywhere in forests and cattle country from Mexico to Chile and Argentina. *Diaemus* is like *Desmodus* but prefers the blood of birds to that of mammals. *Diphylla* is very poorly known, but presumably its habits are like those of *Diaemus*.

Vampires subsist on fresh blood alone.

All parts of their mouth are designed for bloodletting and drinking and nothing but a trickle of liquid could pass through their thread-slender gullets. They scoop out a small piece of skin with their sharp, scimitar-shaped front teeth, press their tongue against the wound, and by curling the sides of the tongue downward against the cleft lower lip form a tube through which the blood flows into the mouth. To assist the flow the vampire pumps and licks the wound with its tongue and sucks with its mouth. It may also enlarge the incision with its teeth. A vampire can consume about two ounces of blood in one night's feeding. This is more than one or two times the weight of the bat. Vampires are slow flyers but by using their wings as forelegs they scurry nimbly along the ground and over their victims. Their bodies are exceedingly soft and smooth to the touch. If echolocation is used by vampire bats for finding objects they may also resort to other senses for discriminating between obstacles, individuals of their own kind, and their prey, which includes other species of bats.

One of my earliest acquaintances with vampire bats was made many years ago in the boundary area between Ecuador and Peru. I was traveling with a family of Indians in a dugout canoe on a tributary of the Amazon. It was the dry season, the river was low, and we spent the nights on mosquito-free sand bars. Ordinarily such sand bars are free of bats, too, and we slept under the stars to enjoy the rare night breeze. At dawn, after the first night, we saw that the little

(Continued on page 5)



"*Noctilio* drags its large feet through the water and hooks whatever small fish may be near the surface with its long, sharp, recurved claws."



Fig. 1: Dr. Robert F. Inger and Mr. F. Wayne King display anti-leech stocking to be worn for protection against land leeches in Borneo.



Fig. 2: Land leech posed on a leaf and reaching out for a victim (actual size of leech about one and one-half inches).

THE Borneo Zoological Expedition, 1962, will leave Chicago on August 18. It would be more correct to say that the personnel—Dr. Bernard Greenberg of Roosevelt University, Mr. F. Wayne King of University of Chicago, and myself—will leave then. For the equipment and the supplies left in June.

The main purpose of the expedition is to gather information on the breeding activity of frogs living in the tropical rain forests that cover most of Borneo. Frogs and toads living in the Temperate Zones generally have relatively short breeding periods restricted to a part of spring. We suspect, on the basis of fragmentary information, that in tropical rain forests, which are warm and wet at all times, frogs and toads breed all year round.

Most zoologists now think that the major groups of frogs and toads evolved in the wet tropics. As the breeding patterns are important to the evolutionary success of any kind of animal, we must learn what they are in tropical frogs.

The field work connected with this

research program will consist of collecting monthly samples of about six species of frogs, making notes on their behavior, and recording daily rainfall, temperature, and relative humidity.

We also need to know how far an individual frog (of the species we will study) moves and how fast it matures in order to understand the full implications of its breeding habits. To get this information we plan to mark, measure, and release frogs along several forest streams. By recapturing (hopefully!) a number of these marked frogs, we will learn not only their rates of growth and movement but also how large the populations are.

As time permits, we will work on other field studies, all aimed at increasing our knowledge of the distribution and interrelationships of the animals in the rain forest. One of these problems, an investigation of the reptiles and amphibians living in epiphytic plants, will be the special concern of Mr. King. Epiphytes are plants, such as bird's nest ferns, pitcher plants, and orchids, that

ROBERT F. INGER
CURATOR, AMPHIBIANS AND REPTILES

DEPARTURE OF

BORNEO ZOOLOGICAL

grow attached to trees and whose roots do not reach the ground. Mr. King will try to discover not only what species of reptiles and amphibians live in such plants but also their abundance, their vertical distribution, and the weather conditions under which they live.

What collecting is done on this expedition will be subordinated to solving the particular biological questions raised by study of material previously collected during the Museum's Borneo Zoological Expeditions of 1950 and 1956.

Though we are concerned primarily with the biological problems, we are naturally forced to consider logistical ones. What supplies and equipment will we need? When and how do we ship them? The second question is easy to answer, merely requiring a telephone call to one of the export agents in Chicago. The answer to the first question depends on our previous experience in Borneo and the specific projects we will tackle in the field.

Out of curiosity, we counted the different kinds of items we are taking into the field. We found we had 173, not including our field clothing. Many of these items are strictly for housekeeping: for example, we have three packets of sewing needles, a folding table, an alarm clock, two can openers, three jungle hammocks, and similar uninspiring but vital equipment. Collecting equipment includes 30 snake bags, two potato rakes (for tearing apart rotting logs), 500 blow-gun corks, three headlights, dip nets, etc. For preserving and packing specimens we have—among many other things—5,000 numbered tags, 2,000 plastic bags, 115 pints of formalin, three plastic hydrators, and dissecting instruments.

We also have some delicate instruments such as a hygrometer with a 200-

CAL EXPEDITION

foot extension cable, which we will use for reading the temperature and relative humidity in the bird's nest ferns, and a recording thermohumidigraph (Fig. 3) for use in more accessible places. In addition to these we have a tape recorder, rain gauge, clinometer (for measuring heights of trees and epiphytes,) compass, surveyor's tape, and assorted photographic equipment.

As the success of any expedition nowadays depends upon the quality and quantity of field notes, we have paper, notebooks, waterproof ink, and pens.

One piece of field clothing requires special mention—anti-leech stockings (Fig. 1). The humid forests of Borneo are rich in land leeches and in some areas and times every leaf of every bush seems to have a hungry leech reaching out for the next passerby (Fig. 2). These animals are interesting, but their fondness for human blood makes protection against them important. We learned on previous trips that an over-stocking made of muslin and tied over one's trousers below the knee cut down the leech bites significantly.

With the exception of one item, we are taking no food from here. All of that will be purchased in Borneo. The exception consists of two cans of high-protein pabulum—not for us, but for the tadpoles we hope to raise.

All this material, believe it or not, fit into 15 medium-sized boxes. With such an assortment of things, the contents of each box had to be listed and the boxes numbered. Museum men always have in their minds the horrible example of the large expedition (not from this institution, we hasten to add) that arrived at its base camp with 100 boxes and not a single packing list.

Months ago a tentative field base was

selected on the basis of our previous experience in Borneo and study of our collections. The chosen site was in Sarawak and we applied for and received permission to work there from the authorities in Sarawak.

In many ways this expedition reflects the national and international cooperation vital to scientific progress. Mr. Tom Harrison, Curator of the Sarawak Museum, has graciously offered to continue the cooperation and help he gave previous expeditions of Chicago Natural History Museum. Similarly, other agencies of the Government of Sarawak have been helpful as in the past. Our Museum hopes that previously published results of our work on the Bornean fauna and future publications growing out of this expedition will be of value to the government and people of Sarawak.

At the national level, the expedition is largely financed by the National Science Foundation. Part of the cost, however, will be borne by Chicago Natural History Museum and Roosevelt University. Finally, the field work and subsequent research will be carried out by representatives of three Chicago institutions—our Museum, Roosevelt University, and the University of Chicago.



Fig. 3: Thermohumidigraph for recording temperature and relative humidity is placed in field chest for shipment to Borneo.

BATS—

(Continued from page 3)

girl in our company had been bitten by a vampire bat on the very tip of her nose. The child felt nothing and apparently suffered no ill effects. The next three nights of our journey were spent in the same way and each morning we discovered that another bit of the tip of the girl's nose had been sliced away and oozed blood. During these nights all of us were equally exposed to vampires. Yet, a single bat preyed on the same victim night after night. Was it the same bat that attacked the child each night in successively different camps or was it a different bat each night? Did the vampire prefer the girl because of a predilection for her type of blood or because she slept more profoundly than the others?

Years later, in Suriname, I achieved a more intimate acquaintance with a vampire bat. Sleeping accommodations for the first night on the banks of my Saracca River camp in Suriname were provisional. I used a hammock as did also our native assistant, while my companion, Dr. Jack Fooden, rolled himself in a blanket and slept on his cot. Mosquitoes were absent and no netting was used. Minutes after turning off the kerosene lantern and dropping off to sleep I was awakened with a violent start by a sharp pain on the big toe of my left foot. A vampire bat had bitten me. (It is strange that some victims are awakened by the attack of a vampire bat, while others sleep soundly through repeated attacks.) With the aid of a flashlight I saw that a thin sliver of skin about one-half inch long had been sliced out of my toe. A finely honed razor could not have cut more neatly. I bandaged the bleeding toe with a handkerchief, covered my feet with a sheet and wrapped the edges of the hammock around me. All the while the hungry bat remained in attendance, now flying back and forth, now hanging nearby in watchful expectancy. I spent the early part of the night warding off attacks made by the animal each time it thought I had fallen asleep. The vampire finally

(Continued on page 8)

50 Millionth Visitor

On July 2, Chicago Natural History Museum welcomed its 50 millionth visitor since the present Museum building opened in 1921. The special guest was



"My gosh, this is really something!" was John Witte's reaction when informed by Director E. Leland Webber that he was the Museum's 50 millionth visitor to its present building.

John McFaul Witte, 12 years old, of nearby Westchester, Illinois. He had come to the Museum with his parents, Mr. and Mrs. John S. Witte, and a young friend, Steve Larson, especially to see the *Tutankhamun Treasures*.

The 50th millionth visitor was greeted by Director E. Leland Webber, who presented him with a \$500 Life Membership certificate in the Museum and a book on ancient Egyptian art. John and his family then enjoyed a personally conducted tour of the King "Tut" exhibit

by Dr. Mohammed H. Abd-Ur-Rahman, First Curator of the Egyptian Museum, who has accompanied the *Tutankhamun Treasures* on their American tour.

The first annual attendance figure of one million visitors to Chicago Natural History Museum's present building was reached in 1927. In 1937, 14-year-old John Ladd, of New York City, had the distinction of being the Museum's 20 millionth visitor. (Mr. Ladd wrote us recently from his home in Belmont, Massachusetts, that he is "finishing up a period of graduate study in anthropology at Harvard University with Panamanian archaeology as my present area of specialization. Although circumstances have kept me away from Chicago and the Museum, I have followed its growth and changing exhibits through the Bulletin, and as an archaeologist have been especially grateful for the Museum publications.") Since the war, Museum attendance has continued to rise, reaching 1,307,567 in 1961, a gain of 63,193 over the preceding year. In the first six months of 1962, there have been 671,866 visitors.

Treasures A Success

When the last visitor left the *Tutankhamun Treasures* late on July 15, the final day of their exhibition here, attendance figures for their one month's display in Chicago had reached 123,722. Between 9 A.M. and 8 P.M. on that final Sunday, 8,839 persons—a record for the Chicago showing—saw the priceless, 3000-year-old objects from King Tutankhamun's tomb, which had been permitted to leave Egypt for the first time. The exhibit was brought to Chicago under joint sponsorship of the Museum and the Oriental Institute of the University of Chicago.

Next stop for the *Tutankhamun Treasures* will be Seattle, followed by San Francisco and Los Angeles. Before returning to their permanent home in the Egyptian museum in Cairo, the treasures will tour American cities for another year.

Chicago Natural History Museum

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.

His Excellency Mahmoud Riad, Ambassador of the United Arab Republic to the United Nations, and Dr. Ahmed Fakhry, Professor of History of Ancient Egypt and the East at the University of Cairo, discuss the King Tutankhamun Treasures with guests at the preview of the exhibit held June 14. The Ambassador made a special trip from New York to Chicago to be present at the preview.



(Continued on page 8)

The camouflaged inchworm in the black-eyed susan is natural size; the enlargement shows how the camouflage is achieved. The flower parts—pieces of yellow petal and black parts of the florets—are bitten off and attached to the pair of spines on each segment. Silk spun by the caterpillar (and perhaps exuded by the spines) holds the camouflage in place. When the inchworm is on the “eye” of the black-eyed susan, it is very inconspicuous. Note the second caterpillar on the flower.



A DECORATED INCHWORM



WE FOUND one of the most intriguing examples of camouflage in nature in an ornamented or decorated inchworm on the black-eyed susans in our garden on the last weekend in August. The weather was hot, 95° F., and humid, and the black-eyed susans were thriving, drinking in the sunshine and radiating vitality, like zinnias.

This heat seems to suit insects, too, which never have been more plentiful than in these mid-day hours, and the black-eyed susans were favorite places for a host of them:—flies, some small and metallic green, some big, dull and brown, and many intermediate ones; gnats of various sizes; black-spotted, red ladybird beetles, little round, green beetles with long antennae, and slender orange and black beetles; leaf hoppers of several shapes and colors; little grey moths folding their wings along the stems; a red-bodied dragonfly; grasshoppers, some green, some brown; bees,

from tiny ones to black and buff humble bees as big as the end of my finger; various sizes of wasps, and winged aphids. Such profusion of insect life feeding on the flowers, on nectars, juices, and tissues, or on each other, brought special predators, too, such as ambush bugs with their distinctive black markings, which lay in wait, as did the pale, yellowish white crab spiders.

Indicative of the minute animals hidden within the microcosm of a single flower head, we saw tiny, insect-caused galls on the florets, and a diminutive red mite which came out onto a petal and, as we saw through a lens, seemed to scratch its venter with four of its eight legs in quick succession before it ran back among the florets and disappeared.

Then Mrs. Rand picked from a flower what seemed to be a tiny mass of debris of flower parts caught in a bit of spider web. It proved to be an inchworm, a half-inch long, with bits of yellow petals

and black floret parts stuck all over its back. Imagine our delight at finding one of these decorated insects—the caterpillars of a greenish, geometrical moth—about which we had read and wondered.

Last year, after having run across a photograph of one posed on a golden-rod, we spent several days in vain search through a nearby goldenrod field. From the photograph, which showed a caterpillar as big as a cigarette, we had not been prepared for anything this small. Now that we knew what to look for—such tiny things—we soon found two more, and installed them on flowers in a dish where we could watch them

(Continued on next page)

through a reading glass.

Without their decorations these inchworms, despite their small size, would still have been unusual. They were dark brownish grey with pale grey longitudinal stripes, and each of the central segments had a pair of projections. It was to these that the yellow pieces cut from the petals and the black pieces from the florets of the black-eyed susans had been stuck, presumably with silk spun by the inchworm. The result camouflaged the caterpillar wonderfully against the brown-black, yellow pollen-dotted "eye" of the flower.

Much of the time the inchworm looped along, in its half circle pose, and browsed on the florets as placidly as a cow in a meadow. Once, while we watched it, it actually broke off part of a floret and, bending back, stuck it onto its back. Sometimes the inch-worm's head was liberally covered with yellow pollen grains. The forelegs seem to come into play here, but whether they were wiping the pollen away or pushing it into the caterpillar's mouth we could not tell. Occasionally the inchworm made a short journey out onto a petal, where it was conspicuous against the yellow and where it ate scallops into the edge of the petal. But soon it would return to the dark "eye" with which it harmonized so well.

This type of camouflage seems as wonderful as that of the ocean crabs which put sponges and algae on their backs for concealment or protection. It is quite well known to the entomologists, but seemed dismissed in a very perfunctory way in some of our textbooks by "... the larvae of these geometrid moths conceal themselves by attaching bits of plants to their backs . . .," or some such phrase. In a more popular book with the photograph I mentioned above the phenomenon was dramatized on a scale that led me to look for a much larger caterpillar, one that could be watched without difficulty. When we did find it, our first response was one of chagrin,—"is it as tiny as this!" This well illustrates the razor edge we try to travel when we write of the wonderful happenings in nature.

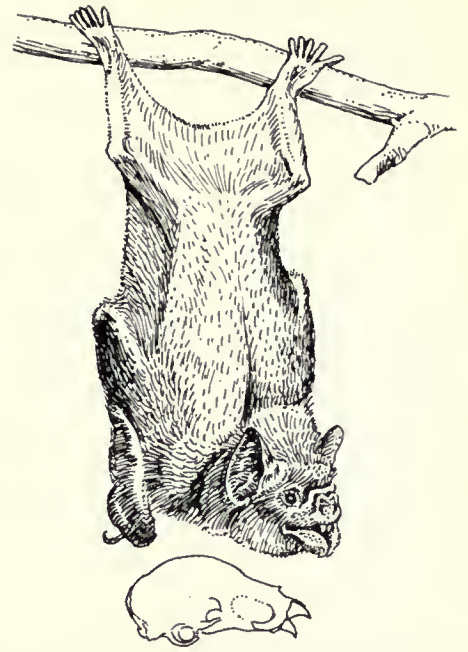
Bulletin drawings by E. John Ptiffner. Cover photograph by Joanne Evenson.

BATS—

(Continued from page 5)

gave up and I slept undisturbed for the remainder of the night.

The following night, Fooden and I slept under mosquito net shelters. Just as the light of the lantern faded out, I felt the bat strike my net with its wings. Not finding an opening, it tried Fooden's net with no more success and then flew off to find a meal elsewhere. This bat's quiet but efficient inspection tours became routine, and one night its persistence was rewarded. It found the wall side of Jack Fooden's netting snagged and raised just a crack above the bedding of the cot. The vampire snuggled inside and scurried on its four limbs to the sleeper's face. Sensing the intruder, Jack awoke with a cry, jumped out of bed, seized a flashlight and searched for the bat. I aided, but the alarmed animal escaped through the same opening it had used for entering. Undismayed, the bat hopefully continued its regular nocturnal visits during the rest of our six-weeks' stay on the shores of the Sarumacca.



"The hungry [vampire] bat hanging nearby in watchful expectancy." Lower drawing shows skull with "scimitar-shaped front teeth."

Vampire bats, insect eaters, fruit eaters, nectar eaters, and the means they use for getting their food are shown in the Museum's Exhibit-of-the-Month—"Bats, The Only Mammals That Fly"—in Hall 15.

MUSEUM NEWS—

(Continued from page 6)

Children's Program

"Universe," a color motion picture about a journey through space, will be presented Thursday, August 9, at 10 A.M. and 11 A.M. in the James Simpson Theatre. It is the last in the Museum's summer series of free films for children. The program will also include a cartoon, "Romance of Transportation."

Evening Hours Continue

Summer evening hours of 9 A.M. to 8 P.M. on Wednesday, Friday, Saturday, and Sunday will continue at the Museum through Sunday, September 2. On Monday, Tuesday, and Thursday the Museum doors are open from 9 A.M. to 6 P.M.

The Museum's late evenings coincide with the nights of the free Grant Park concerts which begin at 8 P.M. Dinner is available in the Museum's cafeteria until 7 P.M. on these four evenings each week. Free parking is available in the north parking lot.

After September 3 the Museum will resume its fall schedule of hours—9 A.M. to 5 P.M. seven days a week.

In Memoriam

The Museum reports with regret the death of Cornelius Crane, Museum Benefactor, who died on July 9 at the age of 57 in his summer home in Belfast, Maine. Mr. Crane was the son of Richard T. Crane, Jr., former Museum Trustee, and a grandson of Harlow N. Higginbotham, Museum President from 1898 to 1908.

In 1928 and 1929, Mr. Crane led an eleven months' expedition to the south seas for the Museum, for which his brigantine yacht, *Illyria*, was fitted out with a scientific laboratory. The late Karl P. Schmidt, former Chief Curator of the Department of Zoology, accompanied the expedition as scientific leader. More than 6,000 zoological specimens were collected by Mr. Crane and his party in the Caribbean and in the Pacific. Upon his return, Mr. Crane was named a Museum Benefactor by vote of the Board of Trustees.

CHICAGO
NATURAL
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MUSEUM

Bulletin

Desmids: Some of the "jewels"
from Lake Michigan featured
in September's exhibit-of-the-
month.



VOL. 33 NO. 9
SEPTEMBER 1962

FEATURED EXHIBIT FOR SEPTEMBER

Cladophora: A widely distributed green alga.



MICH

Lake

THERE are many marvels in the world of plant life. It is very difficult to see and appreciate many of these, however, because they are located in distant places, are rare, or are too small to be seen without a microscope. Chicagoans are fortunate to have at hand, in Lake Michigan, one of the most marvelous forms of life, the microscopic algae, which abound in these waters in a variety difficult to imagine—and to have in the Museum, in the Hall of Plant Life, a series of enlarged glass models, hand-blown with exquisite skill to illustrate the principal groups of bacteria and algae. These exhibits bring into view, as though one were peering at them through a microscope, details of form and color in a variety of these tiny plants which directly or indirectly are involved in our daily lives. It is in overcoming such difficulties of size, distance, time, and situation that Museum exhibits serve their most useful educational purpose.

Among members of the plant world which form a large part of the free swimming or floating organisms called plankton, are the diatoms: tiny, one-celled algae from 1/5000 of an inch in diameter up to the size of a pin head. Despite their small size, they have an unusual beauty scarcely equalled by any other form of life in the intricate markings, beadings, and designs borne by their exterior cell wall of silica. For this reason, diatoms are often called the “jewels of the waters.” The outer layer of silica is as indestructible as glass or quartz. Among the great variety of forms we can find disc shapes, with radial or concentric designs, canoe shapes, triangles, quadrangles, and other geometric forms. Sometimes diatoms live free as single units, or they may be united in long fila-

ments set end to end at opposite corners to resemble a complicated game of dominoes, or they may be joined together laterally like shells in a cartridge belt. In addition to beauty of design and unique form is the attraction of their golden color. When sunlight strikes shallow water containing diatoms the water appears to glow with a golden light, because in addition to the green chlorophyll common to all algae, diatoms have a brown pigment which masks the chlorophyll and produces the golden color.

These ornamented little gems possess a special and intriguing method of movement which is one of the most unique in the natural world. Without the aid of either flagellae or cilia, which are common to other motile unicellular forms, the diatoms appear to use a slow-motion form of jet propulsion achieved by expelling a mucilaginous substance which propels them forward.

Diatoms are a major source of food for all animals living in water, beginning a nutritional chain when, with the aid of sunlight, they build organic matter by photosynthesis. Diatoms are eaten by very small crustaceans; these are de-

voured by small fishes and by larger crustaceans; these in turn are eaten by larger fishes, which may be caught by man. Therefore, the chain of life begun by the diatoms is ended in the frying pan of a lucky fisherman.

Diatom “shells” form large deposits known as diatomaceous earth, which is used in many ways—in insulating and sound-proofing materials, paints, filters, toothpaste, and polishing powders, to name only a few. Although some of us may think that we and the diatoms lead separate lives, we are actually quite close, as there are many diatoms not only in our bird baths and fish tanks but we also brush our teeth with diatoms and take baths with diatoms!

The diatoms are not the only wonders offered us by Lake Michigan. There are the flagellates, which present characters of both the animal and the plant world, to such an extent that it is impossible to decide to which of the two great groups in which man has divided the living world these belong. For instance, in comparing a cat and a daisy, it is easy to apply our classification keys and decide which is plant and which is animal. Such keys, however, do not easily apply

MICROSCOPIC PLANTS:

Michigan's "Jewels"

PATRICIO PONCE DE LEON

ASSISTANT CURATOR, CRYPTOGAMIC HERBARIUM

to this minute organism, for man's methods of classifying living material were made before he encountered this form of life. Therefore, in observing the specialities of *Euglena viridis* (a flagellate represented in our exhibit) we find that it contains chlorophyll as do most plants, that it moves about as do most animals (and some plants), and that it feeds at times as an animal does but at other times as a plant, manufacturing its own food with the aid of sunlight. Thus flagellates represent a generalized way of life that many plants and all animals still retain at some stage of their life cycles: the one-celled flagellate form.

Among the numerous other forms of microscopic plant life in the waters of our lake are green algae, many of them having unusual shapes that might have inspired the futurist painters (see *Scenedesmus* and *Staurastrum* in our exhibit). One of the most important of the green algae, *Chlorella*, has become almost indispensable in physiological research laboratories because it is easy to obtain, to handle, and control, and exhibits very rapid reproduction and growth. It was chosen by Dr. Melvin Calvin and his associates at the Radiation Laboratory

of the University of California as the green plant to be used in their efforts to uncover one of nature's most closely guarded secrets—the intermediate steps in photosynthesis. In addition, this diminutive alga has been considered as a possible solution to the problem of feeding the world's starving millions, as it can produce annually an estimated 20 tons of food per acre as compared with 1 to 2½ tons per acre produced by corn. In one day's time *Chlorella* can double its weight, using only the most simple materials and sunlight, and thus may well be the hope of future humanity.

In the shallow water of Lake Michigan's quiet areas are found the so-called "blue-green" algae, a group that has characteristics of very primitive organisms. Like bacteria, they have no organized nucleus; in fact, in some blue-greens there is no evidence of any structure resembling a nucleus. Reproduction takes place by simple division. They do have chlorophyll, enabling them to manufacture food as do other algae, but it is masked by a blue pigment. They, along with some of the bacteria, are able to utilize free nitrogens in their manufacture of food, which other algae cannot

do. They can live alone or in colonies. These colonies may appear as filaments, or may form large gelatinous masses, such as *Nostoc*. Some genera move about by means of oscillation, turning from one side to the other, but the remainder of the genera are not motile.

On the lake bottom in shallow water can be observed many filaments of green color which belong to the sedentary green algae. Among them we find the common *Oedogonium* whose various stages are clearly illustrated in our exhibit; *Ulothrix*, which literally carpets the shallows of all of the Great Lakes and is responsible for the green appearance of Niagara Falls; *Cladophora*, which has the largest world distribution of any filamentous alga and forms great masses known as "lake balls"; and *Spirogyra*, or "water silk," with its ribbon-like chloroplasts interlaced in a spiral form, resulting in such great beauty as often to monopolize the attention of the students using a microscope. Another green alga is *Hydrodictyon*, or "water-net," which forms colonies in the shape of a mesh bag. The net or mesh is made by the conjunction of many individuals at certain points to form pentagons and hexagons. Although *Hydrodictyon* is very widely distributed throughout the world, it is also "rare" in the sense that it occurs only in isolated or locally limited spots—for example, one population may occur in South Africa, another in Siberia, another in Argentina, and one in Illinois.

Of course we have to tolerate a few inconveniences which accompany these marvelous algae—that fishy taste and smell of the water in the summer months is attributed to oily food reserves built up by diatoms and by the flagellate *Dinobryum* instead of starchy food reserves commonly built by other plants. The large colonies formed in our lake by these organisms may clog filters of pumping stations of the city water supply. However, when we consider our pleasure in their beauty, their great usefulness in numerous manufactured products, and in our research laboratories, the slight difficulties they may cause are far outweighed by the many benefits afforded us by these micro-organisms with which we are closely associated in our daily lives.

In Memoriam

The Museum regretfully reports the death on July 18 of Dr. Wilfrid D. Hambly, Curator of African Ethnology from 1926 to 1952. The noted anthropologist died in Chicago at the age of 75.

Born in Clayton, Yorkshire, England, Dr. Hambly was educated at Hartley University College and at Oxford University. He began his career as a teacher of biology, turning later to the field of ethnology. In 1913 he joined the Anglo-Egyptian Sudan Archaeological Expedition as member for the Wellcome Historical Museum of London. Following the first world war, during which he served in the British Royal Naval Division, he became a lecturer in biology at Eastham Technical College and a research worker for the Industrial Research Board in London. Dr. Hambly came to the United States in 1926 to join the staff of the Museum. Subsequently he became an American citizen.

Dr. Hambly's 26 years of association with the Museum were distinguished by many noteworthy contributions to the field of African ethnology. In 1929-30 he was leader of the Frederick H. Lawson West African Expedition which explored the vast area of Angola and Nigeria. The collections that he brought back, representing many tribes of both countries, form a large part of the exhibits in the Museum's Hall of African Ethnology. In addition, Dr. Hambly's African studies resulted in a number of scientific papers published by the Museum, as well as many popular books and articles for both children and adults. In recognition of his scholarly research in the field of African ethnology, Dr. Hambly was awarded the degree of Doctor of Science by Oxford University.

After his retirement, Dr. Hambly continued his intellectual pursuits, returning often to the Museum. His gentle, warm personality will be greatly missed.

Resignation

Allen S. Liss has resigned as Custodian of Collections for the Department of Anthropology to accept an appointment

as Curator of the Museum of Natural History of the State University of Iowa. A graduate of the University of Chicago, Liss had been a member of the staff of Chicago Natural History Museum since 1955. While associated with the Museum he cooperated with the Illinois Archaeological Survey in numerous excavations of prehistoric Indian sites throughout the State of Illinois. His new appointment at the State University of Iowa will include the teaching of courses in muscology.

Replacing Liss is Mr. Christopher Legge, who joins the Museum's staff after 23 years with the British Colonial Service in Fiji.

Legge was born in London, England, and received his bachelor's and master's degrees from Cambridge University. After graduating with honors he stayed on at the university to participate in a special preparatory program for the Colonial Service. His first assignment was in Nigeria, where he remained from 1928 to 1934. In 1938 he re-entered the British Colonial Service for duty in Fiji, where he remained as Commissioner until 1961.

Legge has long been interested in anthropology and is currently engaged, with Professor J. W. Davidson of the Australian National University, in research on the life of John Jackson, an Englishman who lived with the natives of Fiji in the 1840's.

Research-in-Progress

A 200-year-old research project initiated by King Charles III of Spain in the mid-1700's was brought near to completion this summer at Chicago Natural History Museum.

The project began when the Spanish king charged a Royal Botanical Expedition to New Spain with the task of surveying the natural resources of his domains in North America, and especially in Mexico. The principal botanists of the expedition, Dr. Martín Sessé y Lacasta, a Spaniard, and D. José Mariano Mocino, a native of Mexico, visited many parts of Mexico and the West In-

dies between 1788 and 1804. They amassed a large collection of approximately 7,700 herbarium specimens, representing many species new to science.

The two botanists never published the results of their work, however, and most of their collection remained unstudied in Madrid until 1936, when the specimens were loaned to this Museum to be mounted and identified. This work was begun by Dr. Paul C. Standley, at that time Curator of the Herbarium, and was continued with frequent and long interruptions until his retirement in 1950. In 1959, Dr. Rogers McVaugh, Museum Research Associate in Vascular Plants and a member of the faculty of the University of Michigan, undertook to prepare a critical catalogue of the collection as corollary to his own work on a flora of western Mexico.

This summer Dr. McVaugh spent a



"MIGR

At this time of year, when we can see to take wing for the south's warmer climate for children called "Migration."

The Journey focuses on insects, fish movements east, west, north, south—and from mountain to plain; from cold climate. Journey will learn where the monarch butterfly migration of sea lampreys differs from the fishes migrate; what bird "flyways" pass flight during the year; where the black w the migrating buffalo in the years before.

Children (and families, too!) wishing at the north and south doors of the Museum. Journey has been completed, the filled boxes provided at each Museum entrance applied toward the Museum's Journey a fall Journey on "Migration" will continue.

month at the Museum to further the work of identifying, listing, and annotating specimens and preparing a final report on the botanical survey begun two centuries ago. As soon as final checking of literature and duplicate specimens in European herbaria can be accomplished, the specimens will be returned to Spain—as a much more valuable, usable, and botanically important collection than King Charles knew.

Staff Notes

Mr. William D. Turnbull, Assistant Curator of Mammals, recently returned from a reconnaissance trip to Montana, Wyoming, and Colorado in search of new Mesozoic and earliest Tertiary fossil mammal localities. He examined a number of Jurassic formations in these western states, including the Morrison formation, which produced the earliest

known mammal materials from the New World. Similar prospecting in several Cretaceous formations yielded fossil mammal materials from the Dakota, Mesa Verde, and Lance formations and from a new locality in the Hell Creek formation (a Lance formation equivalent). Greatest success was achieved at the Tongue River formation, a new Late Paleocene locality in Central North Dakota. There an extensive number of small fossil mammal materials were collected, thanks to the lead and friendly assistance of the site's discoverers, Dr. and Mrs. Edmund Vinje, of Hazen, North Dakota. At the site, pantodonts, carnivores, condylarths, multituberculates, marsupials, and insectivores were recognized, and it is quite likely that at least eight or ten orders will be distinguished in the collection when it is studied.

D. Dwight Davis, Curator of Vertebrate Anatomy at Chicago Natural History Museum, is one of twelve nationally recognized scholars who lectured at Harvard University during August at a summer institute on the teaching of comparative anatomy. Attending the six-weeks' institute sponsored by the National Science Foundation were 40 college teachers selected from academic institutions in various parts of the United States. Purpose of the institute was to review and to re-evaluate the teaching of comparative anatomy. Davis presented five lectures on the history of the concepts used in this scientific field.

Five members of the Museum's scientific staff were among a group of scholars selected to conduct the "Science for the Citizen" lecture series presented this summer by the Chicago Academy of Science. The lecturers were: Mr. D. Dwight Davis, Curator of Vertebrate Anatomy, Dr. Joseph C. Moore, Curator of Mammals, Dr. Louis O. Williams, Curator of Central American Botany, William D. Turnbull, Curator of Vertebrate Paleontology, and Dr. Rupert R. Wenzel, Curator of Entomology.

Chicago Natural History Museum

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THE BULLETIN

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Members are requested to inform the Museum promptly of changes of address.



NEW FALL JOURNEY

TION"

monarch butterflies and some birds beginning the Museum is featuring a new fall Journey

birds, and mammals, and their seasonal changes; from salt water to fresh; from cold to warm. Children who complete the Journey go at the end of summer; how the seasonal travels of birds and mammals; which bird makes the longest journey; which moth is often found; what people followed the western plains were settled.

Take the Journey may obtain questionnaires at the Information Booth. When the questionnaires should be dropped in the Each child's questionnaire is recorded and the Program held twice a year. The new Journey through November.

This summer zoologists from all over the world have been convening in various cities in the United States to exchange ideas, compare notes, and to discuss current and future research in their particular zoological specialties. Representing the Museum at the meetings of the American Society of Mammalogists held late in June at Middlebury, Vermont, were Dr. Joseph C. Moore, Curator of Mammals, and Mr. Philip Herschkovitz, Research Curator. In Ithaca, New York, Dr. Austin L. Rand, Chief Curator of Zoology, Mr. Emmet R. Blake, Curator of Birds, and Mr. Melvin A. Traylor, Associate Curator of Birds, participated in the XIIIth International Ornithological Congress.

At the conclusion of the Ithaca meet-

(Continued on page 8)



FIG. 1

FOR MOST of us the lure of piecing together a jigsaw puzzle is irresistible. It taxes our ingenuity, completely absorbs our attention, measures our ability to visualize forms, and, above all, it pleases our inherent belief that there is

a pattern to all things and that the simplest, most straightforward way of putting things together is probably the right way.

Unknown to most people is the fact that even today work is being done on a jigsaw puzzle of the grandest proportions imaginable. The puzzle itself was "manufactured" about 150 million years ago. Even the ancient Greeks, however, who were admirably aware of most of the riddles and puzzles of our physical world, didn't see this one. The reason? They were standing on it!

ple geographical similarity there would have to be grave geological, paleontological, and biological implications. However, as Wegener's opponents and critics have pointed out, he was often overzealous to the point that he was guilty of playing heavily upon evidence in favor of the idea and disregarding evidence contrary to it. So that the reader will not be misled, the writer will outline, briefly, evidence on both sides of the question.

In Fig. 1A we see a reconstruction of the "original" continent, Pangaea, as

AT SEA ON A CO

Perhaps the first person to notice it was Francis Bacon in 1620. By that time the first, approximately accurate maps of the Atlantic Ocean had been made. Bacon commented on the remarkable similarity in shape of the western coastline of Europe and Africa and the eastern coastline of North and South America. They appear to lock together like the pieces of a gigantic jigsaw puzzle (Fig. 1A). Since that time, as maps have improved in their accuracy, this same feature has been noted by other reputable men, including the famous French zoologist, Georges Buffon (1780), the U.S. astronomer, Edward C. Pickering (1880), and the German geophysist, Alfred Wegener (1900).

By and large, the observation was regarded only as an interesting coincidence. To Wegener, however, it was something more than a simple curiosity. He made the obvious proposition that the continents of the world were once a large, single mass, and that at some time in the past they split apart and the granitic continents "drifted" away from each other on top of the underlying mantle rocks to the positions in which we find them today. This he called the hypothesis of continental drift.

Wegener spent the remaining thirty years of his life gathering evidence for this hypothesis. Over and above the sim-

Wegener visualized it. (Because this is a flat map projection some of the shapes are necessarily distorted. In order to view it correctly one would have to use a globe.) Note that the correspondence between the actual (above water) coastlines is not exact. This is to be expected. Each continent has, projecting from its coast, a gradually sloping shelf, which is under water but still a part of the continent. The shelf finally drops off sharply to the oceanic depths. Thus it is the outlines of the continents out to their shelf edges that should fit together reasonably well. And in fact, as our knowledge of the shapes of continental shelves increases the correspondence becomes better and better. From Fig. 1A we see that Australia, India, Africa, and South America all come together, with Antarctica in the center at the southern end of the continent. In the north, Europe and North America fit together, with Greenland in between.

In geology the notion of relative time is used to place past events and the ages of rocks. For example, Carboniferous is the name given to rocks and events older than the Permian. The Permian is older than the Triassic; the Triassic is older than the Jurassic, and so on. Thus if a large fault (fracture) disjoints a series of Permian and Triassic layers but does not affect Jurassic layers overlying them, we

know that the fault occurred some time in the Triassic and before the Jurassic. The same kind of reasoning is true of flexures (folds) in rocks.

Looking at a series of folds in Africa it is possible to date them as lower Triassic. In Fig. 2, the lines A, B, and C mark the axes of three of these large folds. At present they go right up to the coast and stop. However, if one were to move South America adjacent to Africa these three folds would be found to continue right on into South America. What is more, the latter folds are lower Triassic

animals and plants, both extinct and presently alive. The extinct plants of the Glossoptera group occur as fossils in rocks of the same age in Africa, South America, and India. Several families of worms and scorpions currently show distributions over southern South America, South Africa, India, and eastern Australia. Some primitive plants and freshwater fishes are found as fossils in the (Devonian) Old Red Sandstone of England. In New York State the (Devonian) Catskill Formation is strikingly similar to the Old Red and carries the same fossil groups. Perhaps the most outstanding example is the primitive reptile, *Mesosaurus*, which exhibits distinct physical characteristics and shows no clear relationship to later reptile groups. Its fossil remains are confined solely to Permian rocks in Brazil and South Africa.

If the continents were not once an interlocking mass, in order to account for these fossil distributions it would be necessary to postulate, at various times in the past, a series of land bridges, or strings of closely spaced islands, crisscrossing the Atlantic in order to permit the intercontinental migration of animals and plants which, though closely related, are now found an ocean apart. Indeed, many biologists, geologists, and paleontologists who are severe critics of continental drift have suggested such bridges. However, when they are pinned down concerning where these bridges connected and when they rose and sank, they become vague and noncommittal. From a geophysical point of view such bridges are virtually impossible.

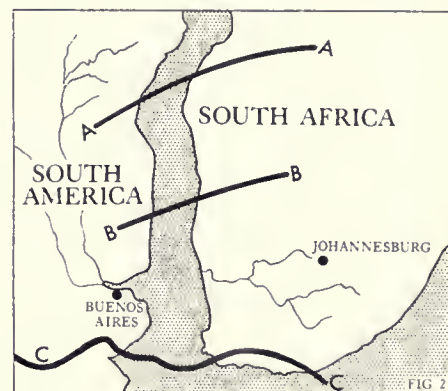
From the mass of data which has been accumulated by Wegener and his followers one could go on presenting evidence to support the hypothesis of continental drift. For our purposes, we must be content with the brief résumé presented above and go on to look at the other side of the question.

The opponents of continental drift point out that the forces required to move masses are so large that they would have caused a major catastrophe in the earth's orbital motion. There is no evidence of such a world-wide catastrophe in the geologic record. For example, a force sufficient to move America west-

ward by 50 degrees of longitude in 30 million years would be sufficient to halt the earth's rotation in one year.

Moreover, if one looks at the occurrences of modern plants of the dogwood family (the genus, *Cornus*), their distribution is found to be eastern North America, southern China, and New Zealand! If this kind of scattered distribution is possible today, it should not be difficult to conceive of ancient plants and animals being distributed in South America and Africa, or North America and Europe, without these continents necessarily having been joined together.

On the basis of fossil evidence Wegener



concluded that the actual split took place sometime late in the Triassic or early in the Jurassic, or about 150 million years ago (Figs. 1B, 1C). Some of his opponents, however, claim that sediments collected from the Atlantic Ocean bottom are older than Triassic. If so, the Atlantic must have been open ocean prior to the time when Wegener concluded that it was supposed to have formed.

So the contest goes on even today. Perhaps the most significant part of the dispute is that concerning the rate of continental movement. In principle, the Americas need not have drifted 50 degrees to the west of Eurasia-Africa, but, rather, each block could have drifted about 25 degrees of longitude each way from what is now the central Atlantic. Thus any tendency for the Americas to stop the earth's rotation presumably would have been more than compensated by the Eurasian-African block going in the other direction. In fact, because of the larger mass of the latter, the earth would have sped up to a fantastic rate if both blocks had moved at the same rate away from the center!

NTINENT!

in age also!

In North America the Appalachian Mountains first show themselves in western Georgia and wend northeastward as a chain of high ridges up through Vermont, eastern Quebec, and Newfoundland. At the northern coast of that island they show no signs of waning in size or gradually flattening out. They simply stop dead at the coast. By moving our jigsaw puzzle piece called North America into its interlocking position with the piece called Europe, we find that the Appalachians connect neatly onto the Caledonian Mountains of England and Scotland, continuing on to Norway and up to Spitzbergen. Furthermore, the ages of the folding that warped up these mountains on both sides of the Atlantic are the same.

Similarly, the swampy fern forests of the Carboniferous are evident today from the vast deposits of coal that run from Illinois through Pennsylvania, as well as through England, northern France, Germany, Poland, and the eastern U.S.S.R. Furthermore, ores of some precious metals common to South Africa are found in similar formations in Argentina, Antarctica, India, and Australia.

Over the past one hundred years, paleontologists and biologists have often struggled with the problems presented by the known distribution of various

MUSEUM NEWS

(Continued from page 5)

Furthermore, if the theory of continental drift is correct, there is no reason to assume that the drifting motion would have ceased. It is presumably going on today. To test this supposition, Wegener's modern proponents have searched and sifted vast amounts of data covering surveys made over the past 100 years of points all over the world. Some of their conclusions are quite interesting. From 1823 to 1933 a small island near Greenland called Sabine Island has been surveyed four times by different men. Its longitude shows a westward shift of about 1300 feet, or about 13 feet per year. Similarly, observations of longitude were made at Godthaab in west Greenland by three surveyors on three occasions from 1863 to 1922. Their results show an apparent average shift westward of about 12 feet per year. The gap between Washington, D.C., and Paris, France, appears to be increasing by about one inch per year. Madagascar, on the other hand, shows an apparent motion of a few inches per year in an easterly direction.

The modern opponents of continental drift point out, quite rightly, that one cannot compare 100-year-old surveys with modern surveys. The older determinations of longitude were subject to large errors, and all of the supposed shifts are within standard allowances for observational error. The defenders of continental drift, on the other hand, point out that such errors are so-called "plus or minus" errors. That is, they could be in either direction, east or west. If one were to look at enough data one would expect to find as many apparent shifts, due to errors, in an easterly as well as a westerly direction. However, all "errors" in studies of movement of the Americas (including Greenland, as well as other localities) are to the west. Studies of Madagascar and Africa show "errors" to the east, just as they should if these land masses are presumed to be drifting eastward.

At the present time, several groups are working on accurate determinations of longitude to find out if such shifts are really taking place. The present techniques use very accurately timed radio signals, which are subject only to very small error. Navigational satellites will also help immeasurably in this kind of

work. Oceanographers are currently attempting to obtain good samples from the deep Atlantic to determine the age of the oldest sediment on its bottom.

The idea of continental drift admits of no middle ground of opinion. Either continents drift, or they don't. Thus the hypothesis has strong defenders and strong opponents. Some of the best minds in modern geology and geophysics are on each side of the dispute. In reality, data on the physical properties of the earth's mantle and its granitic crustal continents are not good enough, even today, to say whether continental drift is physically possible or impossible.

We do know, however, that it is possible for large pieces of continental rock to move *limited* distances. For example, in California there is the famous San Andreas fault, which runs through central California and under the city of San Francisco. The fault is gradually cutting off the southwest side of California and sliding it northwestward. By matching up rocks on either side of the fault it is known that the southwestern block has moved some 100 miles northwestward. As opponents of continental drift point out, however, 100 miles is a fairly small distance in contrast to the distances whole continents are supposed to have moved under the Wegener hypothesis.

At the present time the solution to the problem can only be viewed as a matter of opinion until there is quantitative data one way or the other. Strong opinions, unfortunately, often take the form of jibing jokes designed to ridicule the opposition. Opponents of continental drift enjoy telling a small fiction about an eminent geologist who was an ardent proponent of the hypothesis. This gentleman, one day, was rowing a boat along the African coast. As he approached a protruding ledge of rock he observed that it contained a fossil fish. Unfortunately, only the tail end of the fish remained. Quickly he took out his Wegenerian map of old Pangaea and found the corresponding point on the South American coast. He turned his rowboat around and rowed across the Atlantic to that place. Sure enough, there was a ledge of the same kind of rock, and in it he found the head of the fossil fish. Only one trouble—it was upside down!

ings several ornithologists from other countries traveled to Chicago to study this Museum's bird collections. Mr. C. W. Benson, of the Game and Fisheries Department, Chilanga, Northern Rhodesia, returned with Traylor, who recently spent seven months in Northern Rhodesia collecting birds and mammals. Other foreign ornithologists who visited the Museum are: Mr. Rudyerd Boulton, Atlantica Foundation, Salisbury, Southern Rhodesia; Mr. Jean Dorst, Museum National d'Histoire Naturelle, Paris; Dr. Ernst Shüz, Ludwigsburg, Germany.

Dr. Donald Collier, Curator of South American Archaeology and Ethnology, attended the annual meetings of the Central States Anthropological Society in St. Louis.

Mrs. Paula R. Nelson, Public Relations Counsel, has been appointed co-chairman of the Science Assembly of the Adult Education Council. The Science Assembly will plan programs on science topics for members of the Council and the general public during the coming months.

Mrs. Nelson has also been appointed to the Awards Committee of the Publicity Club of Chicago.

Dr. Louis O. Williams, Curator of Central American Botany, attended the recent Neotropical Botanical Conference sponsored by the National Science Foundation at the Imperial College of Tropical Agriculture of the University of the West Indies in Trinidad. The conference was attended by botanists representing several countries in the neotropics as well as by specialists from American institutions where botanical research has a strong neotropical orientation. Dr. Williams reports that a beginning was made looking toward an integrated research program which it may be hoped will bring greater knowledge to bear on problems of that vast region where nearly half of the peoples of the Americas live.

CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

Vol. 33

No. 10

October

1962



OCTOBER 19 - DECEMBER 9

THE ART OF BENIN

THE ART OF

BENIN



Left: Bronze head. Considered to be an early example of Benin bronze casting (perhaps 15th Century). The pupils of the eyes and the two strips at the center of the forehead are iron.

Height, 7¾ inches.

Phillip H. Lewis
Curator, Primitive Art

Cover: Bronze ornamental mask. The pupils of the eye are iron and a chased copper strip runs down the nose. The mask was worn as a personal ornament, hanging at the hip.

Height, 7¾ inches.

Photographs by the Division of Photography.

All illustrations are from the Fuller Collection.

ART OFTEN establishes a bridge between peoples of diverse ways of life. Not dependent upon spoken or written language, art appeals directly to all men. Visual images that are created and displayed are perceived and, to some degree, understood. Although we do not always know all the meanings and implications that these images hold for the people for whom they are made, often the images are clear enough so that they seem familiar to us.

The art of Benin, to be featured in a special exhibition starting October 19th and scheduled to run until December 9th, often projects such familiarity to those seeing it for the first time. It is a fairly naturalistic art style, and there is little doubt as to what is being depicted. People, clearly recognizable as Africans or as Europeans, various animals and implements, all are represented in the art objects.

This recognition of subject matter helps us to feel comfortable in the presence of Benin art, but there is another, less apparent point of familiarity, also. Benin art is not primitive art; rather, it is art arising in a society in many ways comparable to European societies, with a king, a court, and guilds of artists and artisans. Thus it was made under circumstances similar to much of the art with which we are more familiar.

Of course, there are unknown meanings and contexts of Benin art, for experts as well as for laymen. In spite of this, the viewer of Benin art feels more recognition than mystery. In primitive art, on the other hand, one feels that the subject matter is less understandable, that the styles are more bizarre, that there is more of terror, mystery, and the supernatural involved in the art.

It was not until after 1897 that Benin art was seriously considered by Europeans, although the Kingdom of Benin had been known in Europe since 1485, when the Portuguese first visited it. It is possible that a few objects of Benin art found their way to Europe before 1897, but only after the tragic events leading up to and including the Punitive Expedition of 1897, mounted by the British against the Kingdom of Benin, did the art burst into the consciousness of Europeans.

Three factors were important in the quick acceptance of and great interest in Benin art. First, there was the excitement generated by the military action and the acquisition of art objects as spoils of war. Second, in the late 1890's and the first decades of the 20th Century several large museums had either just started (as in the case of this Museum) or were actively building collections, and consequently were eager to acquire new finds on the market. A third and important factor is a complex one that can only be mentioned here: namely, that the atmosphere of rapidly changing tastes, standards, and styles in the world of European art was very receptive to the acceptance of many new art forms, and Benin art was included among these.

The exhibition combines the Museum's Benin collection with the large and important Benin collection of the late Captain A. W. F. Fuller, which has been generously loaned to Chicago Natural History Museum by Mrs. Fuller. The 329 pieces on display comprise the largest exhibition of Benin art ever shown in this country, and perhaps in the world. A fine early bronze head has also been loaned to the exhibition by the City Art Museum of St. Louis.

In planning this special exhibition, the Museum has been especially fortunate in having the assistance of Dr. Philip J. C. Dark, Professor of Anthropology at Southern Illinois University. Dr. Dark's knowledge of Benin and its art, and his work in the Benin History Scheme, have helped to make the exhibition an authoritative one. Dr. Dark is the author of the catalogue of the exhibition.



Above right: Bronze plaque. A unique feature of this plaque is the representation of two Europeans with such disparity between their sizes. Bronze plaques were used to decorate the interior walls of important buildings.
Height, 16 $\frac{3}{4}$ inches.

Center: Terracotta head. Heads of terracotta are rare in Benin art.
Height, 10 $\frac{3}{8}$ inches.

Right: Bronze pendant plaque. A European is depicted riding a horse. Pendant plaques were worn as personal ornaments.
Height, 6 $\frac{3}{4}$ inches.



PRESENTATION of FILMS Adult

El Salvador, Nicaragua, Costa Rica, and the crossroads nation of Panama can claim the unusual distinction of being located between two great continents and two great oceans. In these countries corn was first produced, and from them also come mahogany, most of the world's bananas, and a wealth of gold, silver, and copper. The heritage of Aztecs, Mayas, and Spanish conquistadores is seen today in Central America's architecture and customs. And like the varied population it supports, the Central American landscape presents many "faces"—ancient ruins, jungles, smoking volcanoes, the Panama Canal and the scenic glories of the Pan-American Highway.

October 20

CHILDREN IN CACTUS LAND

Paul D. R. Ruthling

The education of a naturalist's children living in our southwestern Indian country presents quite a contrast to the education usually acquired in the large eastern and midwestern cities of the United States. Paul D. R. Ruthling gives a sensitive description of "growing up" in the Southwest in a first-hand film account of the daily life of his two little daughters on a 560-acre ranch bordering the Indian pueblo of Tesuque, seven miles north of Santa Fe. At his ranch and in Scottsdale, Arizona (his winter base), Ruthling studies reptiles and works with the Indians of the Southwest, encouraging their crafts and arts and publicizing their work through exhibits and lectures. His children's adventures with the Indians and with the animals of the area provide the theme for this warm and personal film-lecture.

THE Museum's fall series of illustrated lectures for adults invites attention to both the American continent and Europe. Programs will be presented in the James Simpson Theatre on Saturday afternoons during October and November. All of the motion pictures are in color and are narrated in person by their nationally known producers. Lectures begin at 2:30 P.M.; reserved seats will be held for members until 2:25 P.M.

October 6

AUSTRIA

Alfred Wolff

Noted for friendliness, beauty, and charm, Austria has long been a favorite of travelers abroad. The background for Alfred Wolff's film is the memorable scenery of the country—its peaceful val-

leys, picturesque villages set against jagged mountain ridges, romantic castles and sumptuous gardens, and, of course, the beautiful blue Danube. Highlights of the program are film clips of the 1961 meeting in Vienna between President Kennedy and Premier Nikita Krushchev, and the glittering Concordia Ball, Viennese social event of the year. The film includes a stop at a theater-on-the-sea in Bregenz, and attendance at a noble wedding in an ancient castle.

October 13

CENTRAL AMERICA

Dwight Nichols

Linking North and South America is the Central American group of republics, a vital and historic portion of the western hemisphere. Guatemala, Honduras,

TING THE 118TH SERIES

EE

lectures

October 27

THE PEOPLE OF DENMARK AND GREENLAND

Hjordis Kittel Parker

Five university students enjoying a day in the Tivoli gardens in Copenhagen provide Mrs. Parker the means for introducing five distinctly different parts of the Kingdom of Denmark. For those who think of Denmark only in terms of Copenhagen, the film holds some startling surprises, for in this small country can be found a wide cross-section of cultures. Through flashbacks to the earlier lives of the students, each of whom comes from a different part of the country, the story of Denmark's diverse cultures is told—the dairy and farming people of Jutland who work all day against a landscape of idyllic beauty; the fishermen of the island of Bornholm, in the Baltic sea, whose existence depends on filling their nets with silvery herring; the fairytale atmosphere of Odense, home of Hans Christian Andersen; and Arctic Greenland—the world's largest island—whose inhabitants live in mud huts and modern homes and pursue a frugal but vigorous life along its coasts.

November 3

BYWAYS IN BRITAIN

Thayer Soule

Thousands of miles of back roads in rolling green countryside; villages of thatched cottages and mellow stone houses—this is the England that many visitors never see, the England that defies stereotyping. Thayer Soule follows the island's winding roads, taking his camera over the moors, where wild po-

nies roam; far away to rocky headlands; past the sea, with its white beaches and quiet coves, to fishing towns and ruined castles; along rivers lazing through green fields; and down to the shores of mountain rimmed lakes. Although Soule's intent is to present the less familiar byways of Britain, he does not fail to include a touch of the pageantry that is part of every Englishman's heritage—in particular, the majestic State Opening of Parliament by the Queen.

November 10

ONCE AROUND THE SUN

William Ferguson

A motion picture journey of 600 million miles at first sounds incredible, yet every one of us travels that distance an-



nually as the earth orbits the sun. William Ferguson's film records such a journey in the form of a trip through the seasons. The stage is the entire United States—its fertile Midwest, its contrasts of mountains and prairies, forests and deserts, and shorelines—east, west, and south. Beginning with New Year's Day, each month passes in turn, its cast appearing in a brief but brilliant drama that shows us the natural events and phenomena distinctive to each season.

November 17

3,000 YEARS UNDER THE SEA

Stanton Waterman

Approximately 1,500 years before Christ an ancient cargo ship met disaster off the Asia Minor coast and sank 100 feet to the bottom of the sea. More than 3,000 years later, during the summer of 1959, an American diving expedition discovered the wreck. As the ship's cargo of copper ingots, bronze weapons, and tools was raised to the surface, Stanton Waterman, expert diver-photographer, recorded the historic treasure hunt in dramatic underwater motion picture sequences. Occasionally Waterman left the underwater world to visit the classic Cyclades and Dodecanese islands in the Aegean, and to explore a strange "City of the Dead" on the remote southeastern coast of Turkey.

November 24

THE REAL YELLOWSTONE

Fran William Hall

One of America's most imposing national treasures, Yellowstone National Park annually draws millions to its scenes of grandeur. The elk, moose, coyote, antelope, buffalo, and black bear have somehow learned to live with these human visitors and seem almost tolerant of their sight-seeing. But Hall is particularly interested in Yellowstone "out of season" when the people are gone and the wildlife is undisturbed. It is this Yellowstone that he captures in film, presenting the great park's aspects and moods that few people have ever seen.

IN MEMORIAM

Colin Campbell Sanborn, who served the Chicago Natural History Museum as Curator of Mammals from 1936 to 1955, died on August 28, 1962, at the age of 65 at his home in Marcella, Arkansas. He had retired from active work at the Museum in 1955. News of his death was received with deep regret by the many members of the staff who had been his friends and colleagues during his 33 years of association with the Museum.

Born June 12, 1897, and educated in public schools in Evanston, Illinois, Mr. Sanborn came to the Museum in 1922 as a preparator in the Division of Birds. In 1924 he transferred his interests from birds to mammals but retained a certain consistency by specializing in mammals that fly. Appointed Assistant Curator of Mammals in 1931, he became Curator of Mammals in 1937.

To permit him to visit the British Museum in 1948, for a six months' study of bats, Sanborn was awarded a fellowship by the John Simon Guggenheim Memorial Foundation. His achievement of authority on bats of the world led to his becoming a Special Consultant to the United States Public Health Service in 1953, when the country became aroused over transmittal of rabies to people by bats. In this capacity he made an extensive field trip to Trinidad. He received a five-year National Science Foundation grant in 1954 for a world-wide study of the Microchiroptera.

Curator Sanborn made seven expeditions for the Museum, to Peru, Chile, Brazil, Uruguay, Argentina, the Aleutian Islands, and Thailand. He was an active member of the American Society of Mammalogists for many years and served both on its board of directors and as a trustee. He was a charter member of the Kennicott Club, a limited membership club of naturalists in the Chicago area, and served it in various capacities, including president.

Colin Campbell Sanborn published 23 scientific papers in *Fieldiana: Zoology*, 19 scientific papers and notes in the

Journal of Mammalogy, 15 papers in 7 other scientific journals in the United States and 12 papers in 8 scientific journals of other countries.

Sanborn served two years in World War I in the field artillery. He entered World War II commissioned direct in the navy as a senior grade Lieutenant, and during his 3½ years of service advanced to the rank of Lieutenant Commander, serving principally at Lima, Peru. He is survived by his wife, Catherine Sanborn, who lives in Marcella, Arkansas, and two adult daughters, Louise Ann and Judith. An especially able field man, "Sandy" was liked and respected not only by his colleagues in the Museum but by his contemporaries in other institutions, as well.

HALL OF GEMS ADDITIONS

During the past year several new gems have been added to the exhibits in Higginbotham Hall. Mrs. Cyril L. Ward of Evanston generously donated five excellent opal pieces. These are mounted as pins and pendants, each one framed in gold with diamond and ruby settings.

Through purchase from the Mrs. Joan A. Chalmers Fund, the Museum acquired a large crystal (in the rough) of the gem, kunzite. The crystal weighs three and one-half pounds. Kunzite crystals of this size are exceedingly rare.

Most recently, a beautiful cornucopia clip of diamonds set in platinum was placed on exhibit in the Hall of Gems. The clip contains several hundred diamonds, the largest of which are close to one carat. This fine piece was given jointly by Mr. Seymour Oppenheimer, Mrs. Edward H. Oppenheimer, and Mrs. Edward Weiss.

MEMORIAL FUND STARTED

In recent years, many gifts have been received from Members and friends of the Museum, in memory of departed friends and relatives.

In view of the increasing number of

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THE BULLETIN

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these memorial gifts, the Museum has now inaugurated a Museum Memorial Fund into which all such gifts may be placed. This will assure that a permanent record will be kept of all persons thus honored, together with the names of those who send gifts in their honor.

This fund will not replace any of the memorial funds now on the records of the Museum, nor will it prevent the founding of specific memorial funds in the future. It will, however, provide a lasting record of the thoughtfulness of friends of the Museum in honoring those whom they held in esteem.

Those wishing to honor departed friends or relatives need only write to the Museum. Appropriate notice of gifts received will be sent to the next of kin, or other person designated by the donor.

(Continued on page 8)



THE LAW of the conservation of energy is a fundamental principle in the operation of our physical universe. Stated in everyday words it says that you can obtain only as much energy out of a system as you put into it.

As an example we might consider a boy standing in a cornfield throwing a large stone straight up into the air. In order to throw the stone upward he has to put a certain amount of energy behind it. When the stone has reached the top of its climb this energy is nullified by the gravitational pull of the earth, which pulls it back down. As the stone falls it goes faster and faster and finally hits the ground. When it hits, it stops dead. All of its energy of motion is transformed into frictional heat energy. Literally, the stone warms the ground under itself very slightly for a brief time until the heat diffuses away.

In an ideal situation the energy lost

we haven't drifted away from it. The answer is "no." Why? Because light and fluorescence of light are forms of energy also.

Sunlight, for example, is known to consist of a mixture of colors from infra-red through red, orange, yellow, green, blue, and violet to ultraviolet. The mixing together of these colors produces what we call white light. However, as we know, we can use a prism to break up white light into its various colors. Each pure color has its own particular wavelength. As the word "wavelength" implies, light has certain characteristics of waves, behaving much like waves in a lake. However, the wavelengths for light are exceedingly small. For example, red light's wavelength is about 26 millionths of an inch, while ultraviolet light's wavelength is only 15 millionths of an inch. To us these are very small numbers. But to an atom inside a crys-

ing over waves that were 100 feet high. If these wave crests were a mile apart (that is, had a wavelength of one mile) we would rise slowly 100 feet and gently slide down the trough between the waves. We would be in no serious danger. However, suppose the crest-to-crest distance became shorter and shorter. When the crests were half a mile apart, we would still ride them out smoothly. But when they came to be a thousand feet apart we would be experiencing something like a roller coaster ride. When they reduced to 100 feet, we would be violently shoved upward 100 feet and slammed down again. We are now in danger of being turned over because we are being hit with large amounts of energy in short intervals of time.

When very short wave ultraviolet light disrupts the atoms in a mineral in this same way, it imparts to them a large part of its "up and down" energy. The atoms attempt to go back to their stable positions, and in doing so they give off the energy they receive in accordance with the law of the conservation of energy. This energy is emitted from the mineral in the form of light waves again. The wavelength might be blue, green, yellow, red, etc. The color will depend on the kinds of atoms in the mineral. Thus, the mineral is said to fluoresce. The length of time it fluoresces depends, again, on the kinds of atoms present and the time it takes them to settle down once the light has been shut off. For some minerals this time may be several minutes. These exhibit a slow fading away of their fluorescence, and are said to be *luminescent*.

Probably the best fluorescent substances in the mineral kingdom are those minerals which have the atom calcium in them. Good examples are calcite, fluorite, scheelite, and autunite. The colors which these minerals fluoresce under ultraviolet light depend to some extent upon the other kinds of atoms present. Calcite will fluoresce pink, yellow, and carmine red. Scheelite usually fluoresces yellow to light blue. Fluor-

(Continued on page 8)

FLUORESCENT MINERALS

EDWARD J. OLSEN, CURATOR OF MINERALOGY

in heating up the ground is equal to the energy the boy put into throwing the stone. Thus, energy was transferred from the boy to the ground by way of the stone's motion, but the total energy of the situation has not changed one bit. What the boy lost, the ground gained.

To carry this idealized situation a step further, suppose the heat released where the stone fell were totally absorbed by a corn plant growing beside the boy. If the boy were to eat the corn (containing a certain number of calories—that is, energy), he would gain back the energy he used to throw the stone, and we would be back where we started.

This concept of the conservation of energy governs every process, from the burning of a match to an atomic explosion, from the throwing of a stone to the propelling of a rocket ship into space. But the subject of this article is fluorescence in minerals, and you might ask if

tal they are relatively large, because most atoms have dimensions of only about 5 billionths of an inch!

Most minerals are transparent to most wavelengths of light. That is, light passes through and out of the minerals just as the boy's stone passed through the air. The air in that case was disturbed slightly, but not seriously. However, the atoms in some crystals become radically disturbed when light of very short wavelength (ultraviolet) impinges upon them. Instead of all the light passing through, some of the energy of the light is absorbed, causing a brief disruption in the arrangement of atoms in the mineral, in the same way that the stone briefly warmed the ground that it hit.

To understand this better, we might imagine ourselves sitting in a small row-boat in Lake Michigan when a strong wind is blowing. Suppose we were rid-

rite usually fluoresces blue, while autunite fluoresces light green. The color which a fluorescent mineral gives off is in no way related to its color as you see it in normal light.

It is not even possible, at present, to predict whether *visible* fluorescence will occur. We know that some calcium minerals usually fluoresce well, yet the common mineral gypsum (also a calcium-bearing mineral) does not fluoresce in ultraviolet light. The property of fluorescence seems to depend in part on the way the atoms are arranged in a particular mineral. A certain symmetry of arrangement controls the freedom with which the fluorescing atom may react to the incident ultraviolet light. Going back to our analogy of the boat in Lake Michigan, suppose, instead of a row-boat, we were in a large freight boat loaded with fifty thousand tons of iron ore from Minnesota. Such a massive boat would still heave up and down but would react more sluggishly to the waves pounding it. Further, let us imagine that the boat is firmly anchored to the bottom. The waves would wash over it but it would move only a little, being fixed in place by the lengths of anchor chain. So the atoms in some minerals

may be thought to be more firmly "anchored" than in other minerals.

However, it is possible to obtain fluorescence from all minerals if we use wavelengths of light even shorter than the ultraviolet. These very short wavelengths of around 40 billionths of an inch are called X-rays. Under X-rays *all* minerals fluoresce. Unfortunately, they fluoresce "colors" which have X-ray wavelengths and are completely invisible to our eyes. We might think of X-ray waves as having so much energy that they are capable of breaking even the strongest anchor chains our ship could put down.

Returning to visible fluorescence, we might point out that it is not solely confined to minerals. Some natural wood materials as well as some petroleum oils fluoresce in ultraviolet light. Fluorescence may also be stimulated by other kinds of energy. Travelers at sea are often astounded to see large patches of ocean water glowing with an eerie bluish light. This is caused by millions of minute organisms, called plankton, which float on the ocean's surface. Probably most remarkable of all is the luminescence of some jellyfish and insects ("fire-flies"). In these cases the glow is turned

off and on by the animal itself. From what we have said already, we now know that the animal is providing energy, in some form, to cause it to glow in this way. How it does this is now fairly well understood. The animal supplies chemical energy to a certain molecule which absorbs the energy and gives off light of equal energy.

Fluorescence in minerals is viewed with awe by many people. However, as we have attempted to show in this article, it is only an example of the law of conservation of energy. In our world and in the spaces beyond, this law is operating at all times, in all processes. It is also evident in every machine we build and use. We put energy into an auto in the form of gasoline, and from it we obtain energy in another form—the forward motion of the car.

Recently the Museum has installed new ultraviolet lights in its exhibit case of fluorescent minerals. These lights operate on a timer so that one may see specimens of minerals, woods, and oils change their colors as the lights switch from white to ultraviolet. The case, located in the corridor between Halls 36 and 37 (second floor, west), is the Museum's exhibit-of-the-month for October.

MUSEUM NEWS

(Continued from page 6)

DOCTORATES RECEIVED

Two Museum staff members received the Doctor of Philosophy degree from the University of Chicago at the convocation held August 31. The Ph.D. in Zoology was conferred upon Dr. Rupert L. Wenzel, Curator of Insects, while Dr. Bertram G. Woodland, Associate Curator of Petrology, received his doctorate in Geology. Recently Dr. Wenzel was appointed Lecturer in the Department of Zoology of the University of Chicago.

FREE CONCERTS

The Orpheon Chorus of Coimbra, a male choral group from Portugal now on its first American tour, will open the fourth season of musical events to be presented in Chicago by the Free Concerts Foundation. Considered one of the finest choral groups of Europe, the 80 members of the Orpheon Chorus will per-

form, with instruments, in the Museum's James Simpson Theatre on Sunday, November 4, at 8:15 P.M. For free tickets, send a stamped, self-addressed envelope to Free Concerts Foundation, Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive, Chicago 5.

Future concerts planned by the Foundation include: Julius Katchen, pianist, on Tuesday, November 27; Gerard Souzay and Maureen Forrester in joint recital on Wednesday, January 16; the Komitas Quartet, a chamber music group from the U.S.S.R., on Wednesday, February 6; and the Lucerne Festival Strings on Tuesday, February 26. All concerts will be given in the James Simpson Theatre.

Mrs. J. Dennis Freund, Founder and Sponsor of Free Concerts Foundation, has also announced that the Foundation

will present concerts this season in Washington, D.C., New York City, Paris, and London.

CHILDREN'S MOVIES

The Museum's fall series of free movies for children will begin on October 6. Programs will be presented each Saturday morning at 10:30 A.M. in the James Simpson Theatre. Following is the complete schedule:

October 6—The Young of Animals

October 13—Central America

October 20—Children in Cactus Land

October 27—Scotland

November 3—Animals in Winter

November 10—This Curious World

November 17—Challenge of the Ocean

November 24—The Real Yellowstone

CHICAGO
NATURAL
HISTORY
MUSEUM

Bulletin

Vol. 33

No. 11

November

1962



A report from the
STREET EXPEDITION TO IRAN



A Field Report From Iran

The Museum is pleased to publish in this issue of the BULLETIN a first field report from the W. S. and J. K. Street Expedition of Chicago Natural History Museum to Iran.

Headed by Mr. William S. Street of Seattle, the expedition, which has been in the field since August 1st, is making a study of Iranian mammals. Not only will these animals be studied in their natural habitats, but a large variety of mammal skins and skeletons will also be brought back to the Museum for further research.

A few months ago, Mr. Street resigned the chairmanship of the Seattle World's Fair corporation in order to lead the Iranian expedition. A former executive vice president of Marshall Field & Co., Mr. Street had retired earlier this year as presi-

dent of Seattle's Frederick and Nelson department store. He is an experienced and enthusiastic collector of large mammals from distant places and contributed the Museum's Alaska brown bear habitat group.

Mrs. Janice K. Street, who shares her husband's interests in photography, fishing, and big-game hunting, is with him on this expedition in Iran. A third member of the expedition is Mr. Douglas Lay, a mammalogist who is especially interested in bats. Mr. Lay brings to the party in Iran not only his professional knowledge, but the experience he has gained from two extensive mammal collecting expeditions into Tabasco, Mexico.

Further reports from the Streets on the expedition's activities will appear in future issues of the BULLETIN.

William S. Street

The Tehran Palace Hotel

July 23: While we were still in London, Dr. F. C. Fraser of the British Museum turned us over to Mr. J. E. Hill, who obligingly spent all day with us. Whatever we wanted to see, if it was in the Museum's mammal collection, Mr. Hill dug it out; so our stop was well worthwhile. The museum's collection of scientific material was impressive—in excess of 250,000 mammal specimens.

At Tehran we were met by several delegations of persons, all there to help our expedition. The two American Embassy people got to us first. With their help our luggage was cleared through customs. Then we scooped up the others, and had a coke at the hotel with everybody.

over: Mr. Street and Mr. Lay don appropriate gear for hunting at night. They atop the specially equipped travel-all nated by International Harvester Comp- y for the expedition's use in Iran.

left: The expedition members in camp.

The hours of work for most offices here are from seven or seven-thirty in the morning to one o'clock, at which time they close for the day. Banks are open from seven-thirty to twelve noon. The customs office closes at one, so if there is any delay—another day is gone. Despite that, the Embassy cleared our guns and ammo and the air freight shipment promptly. We expect the ocean shipment tomorrow, and shall start unpacking and sorting immediately. We have obtained permission to use storage space in the Red Lion and Sun warehouse. After loading our trucks, we'll look at the equipment that is left and decide whether we can bear to leave any of it.

Eskander Firouz, Secretary of the Game Council of Iran, had a frank talk with us. The Game Council would help us, and he hoped that we, in turn, could help the Council, sometime, to develop a management and conservation program for their fauna. I made it clear that in putting together the comprehensive study and collection we intended—with subsequent publication—we would automatically provide them with the beginnings of a program, since they would know more about their mammals than they now do. Firouz is interested primarily in programs for the large game mammals, partly in order to preserve them for hunting, but I think the Council will become more interested in small mammals as their representative goes with us and sees what we do.

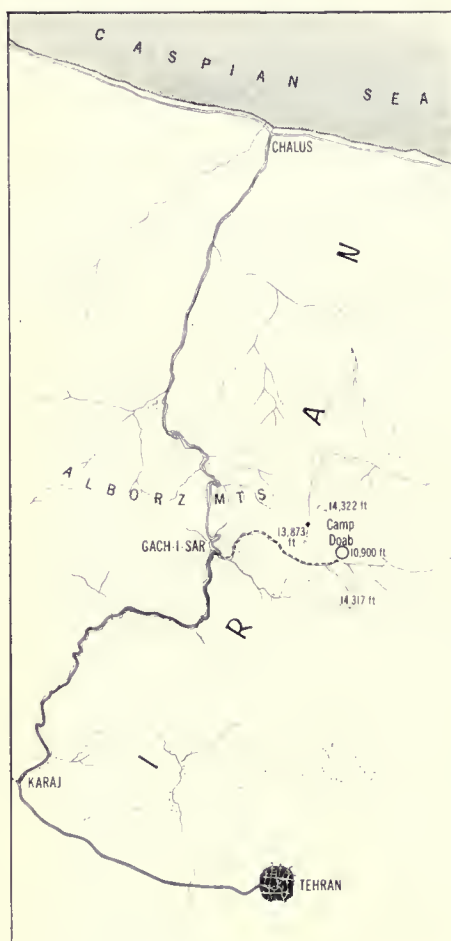
Kosrow Sariri of the Game Council will be with us for six weeks. Apparently he knows the country and has done a lot of hunting. Tall, athletically built—I suspect he'll be terrific as our chief of staff. In addition, two or three wardens will be with us, also, to help us hunt.

We will begin our hunting in a preserve on the right of the Chalus Road. Our first camp will be high, about 10,000 feet. We'll get there by mules arranged by the Game Council. Sariri will

help us with our food list. I expect that with only mules for transport we'll operate a stripped-down camp at first, and our food list will be shorter than we might otherwise have. Yet we expect to eat well on wild meat and plenty of rice!

Camp Doab The Alborz Mountains

(10,900 feet elevation), August 4: Our first camp is about 20 kilometers east of Gachsar, on the crest of the Alborz Mountain ridge. We arrived on August 1st. It was a long trek up. We had 19 animals—horses and mules—to pack us in. Doug walked all the way. I'm glad I rode about two-thirds of the distance, because we arrived at four o'clock in the afternoon and at five I was off to look for sheep. I arrived back at camp that night after nine, dead tired, with a split-



ting headache, but with three rams of *Ovis orientalis*. We shot them at 12,400 feet elevation!—hence the headache and tiredness.

All told, there are twelve of us in camp—Kosrow Sariri, the Adjutant Inspector

in charge of field wardens, two wardens, a cook, a driver, three Iranian workers, Douglas Lay, Mrs. Street and myself.

Today we were to leave at 5:00 A.M. for goats, but a windstorm and clouds came up and obstructed our plans. It was just as well, for after yesterday I was glad to sleep ten hours instead of six. We were up to 13,100 feet yesterday. After side-hilling up the whole mountain to about 2,200 feet above camp, and then coming back straight down the rock slides, I was stiff as a board today. But the weight's coming off, and I feel stronger each day. By the time we pull out for our next camp I expect to be in pretty good physical shape.

The mountains surrounding us are magnificent, and the coloring in the rock slides seems unbelievable: there is an immense amount of turquoise and bluish rock. Alpine flowers are abundant and we have found them as high as we have gone. Some of these we have picked and are preserving in an improvised press.

Doug is working hard with his trap lines, not catching as many specimens as he'd like, but getting some variety. Getting ibex is apparently going to be tough. They stay high in the rocky areas, some of which are impossible for us to reach. There is a great deal of green on the mountains almost all the way up, providing lots of feed for the game as well as for herds of sheep and goats.

Shepherds travel up and down these mountains as though they were walking on the level. One herd we saw had 1,300 animals, of every color imaginable: black, brown, grey, white, tan, and all combinations. Mrs. Street thought the most fetching sight was the occasional ram, billy, or ewe with a string of bright blue beads around its neck. We visited one shepherd's cottage, well above our camp, where eleven men and boys were staying. The place was built into the hill on three levels. The lowest was where they baked bread and stored their milk and cheese; it was as cool as a root cellar. Every so often one of the men would go down to their village, taking the butter they made. Their churn looked like a hollowed out log with a plunger filling the top.

(Continued on page 8)

Art of Benin Continues

On the evening of October 18 an interested audience of several hundred Members and guests enjoyed a preview glimpse of the Museum's new exhibition, "The Art of Benin," which opened to the public the following day.

More than 330 objects from Benin—the largest number ever assembled in this country—trace the artistic and cultural life of this historic African kingdom from the time of its discovery by Portuguese travelers in 1485 down to the present century. Members who missed the preview are urged to schedule an early visit to this unique exhibition, since it will remain on display through December 9 only.

New Research on Tropical Insects

Biting insects which are suspected carriers of tropical diseases will be studied under a three-year grant to Chicago

Natural History Museum from the United States Army Medical Research and Development Command.

Director of the study is Dr. Rupert L. Wenzel, Curator of Insects. As Malariologist for the U. S. Army in Brazil during World War II, Wenzel organized the Army's program to control malaria—a mosquito-borne disease—in the areas surrounding bases on the air transport route supplying the Africa and China-India theaters.

The study will be based on the Museum's extensive collections of fleas, ticks, mites, chiggers, and batflies acquired over a period of many years from northern South America and Panama. Medical researchers realize that many of these insects, which live as parasites on other animals, transmit diseases from their hosts to man. But until these potential disease carriers are identified and classified, and their life histories known, no program aimed at controlling them can be organized.

The Army's grant of \$32,080 over a three-year period will now enable the Museum staff, and collaborators from other institutions, to carry out a program of basic research on the identification, classification, and biology of these insects, some of which affect the health of millions of people living in underdeveloped areas of the world.

The grant also provides for publication of a unique and comprehensive volume containing the first extensive information ever compiled on the host-parasite relationships of the biting insects of Panama; illustrations of these insects and keys to their classification; complete lists of their host mammals; and analyses of the biological and geographical environment in which these insects live.

The 16 papers to be included in this publication are now being prepared by Dr. Wenzel and other biological researchers in the United States, Mexico, and Panama who are collaborating with the Museum on this project. *The Ectoparasites of Panama* will be published by Chicago Natural History Museum.

Top: Mr. Phillip H. Lewis, Curator of Primitive Art, discusses a magnificently carved elephant tusk with Mr. Charles Okpala, Nigerian student at the University of Chicago.

Center: Dr. Donald Collier, Curator of South American Archaeology and Ethnology, answers questions from a group of Members.

Left: Members of the Museum's Board of Trustees, and distinguished anthropologists from the Chicago area and abroad, congratulate Dr. Philip J. C. Dark (center), Professor of Anthropology at Southern Illinois University, who was consultant for the exhibition. Reading from left to right: Dr. Clifford C. Gregg, President; Mr. Joseph N. Field, Second Vice President; Dr. Dark; Dr. Fred Eggan, Chairman, Department of Anthropology, University of Chicago; Dr. Melville J. Herskovits, Director, The African Institute, Northwestern University; Dr. Adrian A. Gerbrands, Associate Director, The Royal Museum of Ethnography, Leiden, Netherlands.

East African Photographs Shown

The intricate mosaic of tribal life in East Africa and the island of Zanzibar is evoked in a new photographic exhibition being shown in the Museum's Stanley Field Hall through November 30.

The photographs were made by Dr. Robert F. Gray, Associate Professor of Anthropology at Tulane University, during two field trips to East Africa in 1950-51 and 1954-56. Of special interest to Gray were the customs of four East African tribes—the Segeju, the Wambugwe, the Gorowa, and the Sonjo. Most of the photographs in the exhibit reflect daily life in these tribes.

The Segeju are one of approximately a dozen Swahili- and Bantu-speaking peoples inhabiting Tanganyika and southern Kenya. Because most of the Segeju villages are located on the coast, they have been influenced by coastal Arabs for many centuries. As a result, every Segeju village has at least one mosque and a school where the children memorize long passages from the Koran and are taught a smattering of Arabic. A blend of Islamic and pagan elements, the popular religion of the Segeju includes elaborate rituals in which the whole village takes an active part.

The Wambugwe, another Bantu-speaking tribe numbering about 8,000, live on the floor of the Rift Valley in northern Tanganyika. Their unusual rain-making ceremonies have provided abundant material for Gray's camera studies.

In recent years the cattle auction has become the major social event of the Gorowa, still another tribe of Tanganyika. The auctions were started by the government of Tanganyika to develop one of the major resources of the country by providing a market outlet for cattle. The photographs show crowds of people turning out for the auctions, which have added a new, commercial aspect to tribal life.

Inhabiting an isolated stretch of land extending into both Kenya and Tan-

(Continued on page 8)

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Children from a Segeju village



The Human Skull— An Evolutionary Puzzle

D. DWIGHT DAVIS

Curator, Vertebrate Anatomy

The living treeshrews of tropical Asia closely resemble the earliest fossil primates. The head still has the long foxlike form of other primitive mammals.



ONCE UPON a time biologists took it for granted that the human body was a sort of final perfection toward which nature aspired. All other animals represented various levels of this aspiring for perfection, and a favorite game was trying to arrange all creatures in a “scale of beings,” with the simplest and least perfect at one end, and man, the highest and most perfect, at the other.

We know now that this was nonsense; there is no transcendental perfection in nature. Far from being perfect, the human body has an astonishing number of imperfections, most of which could have been corrected by any moderately competent design engineer. Most of the human body is primitive, too, compared with that of other mammals. A few parts are drastically modified from the old ancestral condition. This is especially true of the head, and trying to understand just what happened to the brain and skull during the evolution of man has challenged the ingenuity of scientists for generations.

We are accustomed to thinking of the human head as a thing of beauty. Poets

have lauded the “noble brow,” the “chiselled nose,” the “molded chin.” Artists have labored to capture and preserve the perfection of a human countenance. Things are not so simple for the anatomist; as a human being he joins his fellows in admiring a beautiful face or a noble head, but as an anatomist he knows that even the head of a Venus is really one of the most deformed objects in nature. Humanizing the vertebrate head was a rather astonishing process of plastic deformation, but the result is no more “perfect” than the head of a horse or a lion.

No real progress in understanding the human skull was possible until this idea had developed. Men were reluctant to give up the lovely egocentric notion that they represented the one perfect goal toward which all nature had been striving. The idea of evolution, of descent with modification, was accepted only a hundred years ago. The idea of the evolution of man was accepted reluctantly, even by most biologists. “Descent with modification” meant that the human skull, like the rest of the human

body, was only the last in a long series of rather makeshift adaptations.

The devious history of the human skull could not be written truly until the facts were available. Only the fossil record could supply the historical facts, and fossils accumulate slowly. It was not until 1927 that Professor W. K. Gregory published the first of his famous “fish to man” reviews, tracing the evolution of the human skull through the actual fossil record instead of trying to reconstruct it from the skulls of living species of animals as others before him had done.¹ The Museum’s Exhibit-of-the-Month, “The History of the Human Skull,” shows eight stages in the evolution of man’s skull, based on Professor Gregory’s work. Though the number of fossils in the museums of the world has probably more than doubled since 1927, the new discoveries have not changed the plot of Professor Gregory’s story; they have only refined the details.

The fossil record showed that the ancestry of the human skull goes back through primitive primates, then primitive insect-eating mammals with skulls like hedgehogs, then mammal-like reptiles, pelycosaurian reptiles, and so on back to the fishes. The lineage was not particularly hard to work out once the fossils had been collected, but it merely showed what had happened. Then biologists began to wonder how and why the changes leading to the human skull had come about. This was a very different kind of problem. It was also far more difficult to solve.

The skull of the earliest fossil primates was like the skull of other unspecialized mammals—long and foxlike, with the brain lying on a flat bony bed directly behind the face. The axis of the skull

¹ Gregory, W. K., “The palaeomorphology of the human head; ten structural stages from fish to man.” *Quarterly Review of Biology*, Vol. 2. 1927.

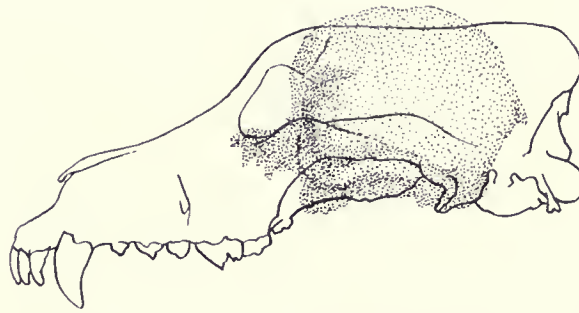
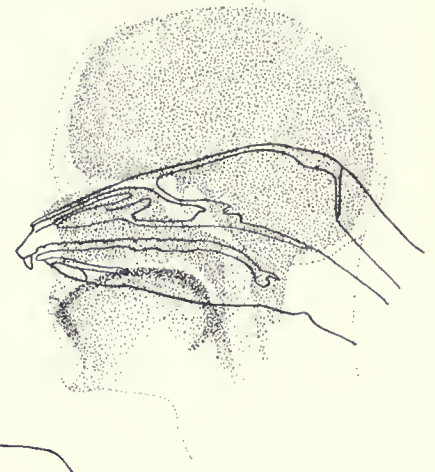
was in a straight line, a neat and uncrowded design that had worked out so well it had not changed much since the Age of Fishes. This arrangement is still preserved in the modern treeshrews of tropical Asia, the lowliest of the living primates.

In the human skull this old design is deformed almost beyond recognition. The once-straight axis is bent around into horseshoe shape, the floor of the skull is ballooned out in all directions, the face is shrivelled to a fraction of its former size and tucked in beneath the brain. What could have been responsible for this astonishing transformation? There are really two questions involved here—the question of the advantages of the change, and the question of the biological machinery whereby the change was brought about.

For a time most biologists thought nearly everything that had happened to the human body was a result of man's getting up on his hind legs and standing erect. The erect posture freed the hands for manipulating things, and this in turn put a premium on curiosity and intelligence and consequently made a highly developed brain advantageous. Obviously the hands had taken over some of the functions of the jaws, and this was thought to explain the degeneration of the human jaws and teeth. The axis of the skull was bent because the skull was now balanced on top of the neck instead of in front of the neck as it once was; it would scarcely do to have the face pointing up into the sky.

This rather naive view runs into trouble if we try to use it to explain everything. Actually the brain is relatively large in all primates, whether they stand erect or not. This remarkable fact has not been satisfactorily explained. Many biologists believe this mysterious tendency in the primate stock toward enlargement of the brain is the key to the evolution of the human skull, and indirectly to the evolution of other features of the human body. If this view is correct, then the deciding event that foreshadowed the eventual evolution of man took place in the brains of the very first primates. An extraordinary thing about the primates is that representatives of all levels of their evolution, from the primitive treeshrews and lemurs through vari-

In the earliest primates the head was long and foxlike, very similar to the head of other primitive mammals. The same pattern is found in the human head, but it is deformed almost beyond recognition. Trying to explain this remarkable transformation has challenged the ingenuity of scientists for generations.



gate skull—the wolflike skull of a dog—and some anatomists think the causes for this transformation were similar to those involved in the origin of the human skull.

The globular skull of the dwarf King Charles spaniel resembles the human skull in many ways. It, too, was derived from an elongate skull—the wolflike skull of a dog—and some anatomists think the causes for this transformation

ous kinds of monkeys and apes right up to man, are still living today. Such primitive and intermediate evolutionary types usually become extinct; their wholesale survival is most unusual. The most likely explanation is that the large size of the primate brain (or rather the intelligence that large size implies) enabled even the lowest primates to get by in competition with other animals where other primitive mammals could not.

The leading advocate of the theory that the brain, rather than upright posture, was primarily responsible for shaping the human skull was the late Franz Weidenreich.² In the developing embryo the differentiation and growth of various parts of the head are controlled by different factors, making the head a mosaic of independent subassemblies that are fitted together during development to form a whole. The face is independent of the cranium, the central nervous system is controlled by its own set of factors, and so on. Consequently, anything that speeds up the growth rate of the brain would not affect the growth

rate of the skull, although the developing skull would accommodate itself as best it could to the expanding mass of the brain.

By assembling evidence from a great variety of sources, Weidenreich tried to show that an abnormally large brain—in dwarf dogs, for example—deforms the skull in ways that are remarkably similar to the human condition. The available bone material simply adapts itself to the size and contours of the huge brain. At the opposite extreme, the growth of the brain is sometimes arrested in man to produce a condition known as microcephaly. Weidenreich showed that in microcephalics the skull is similar to that of the anthropoid apes—in such persons the growth rate of the skull remains normal, but the bone material is not stretched and deformed by a huge brain to the extent that it is in normal persons.

Evidently the biological machinery involved in remodeling the foxlike skull of a treeshrew into the globular skull of man was complex. It was not as complex as we once thought, however, and there seems no reason to think it cannot be deciphered. Both the Weidenreich theory and the erect-posture theory are

(Continued on page 8)

² Weidenreich, Franz, "The brain and its role in the phylogenetic transformation of the human skull." *Transactions of the American Philosophical Society*, Vol. 31, 1941.

(Continued from preceding page)

over-simplifications, as first approximations almost inevitably are. Neither is wholly correct, but there is undoubtedly a good deal of truth in both. The mystery of how gross changes in the structure of vertebrates are produced is slowly giving way to the combined efforts of geneticists, experimental morphologists, and comparative anatomists. Before long we may know not only the what, but also the how and why, of that deformed structure, the human skull.

MUSEUM NEWS

(Continued from page 5)

ganyika, the Sonjo possess a culture that in most respects has advanced very little beyond the neolithic level. Until recently the region was inaccessible to motor vehicles; thus the Sonjo, who as yet have had relatively little contact with the outside world, still wear their traditional skin garments. The fervour with which the various religious rituals of the tribe are enacted is captured in a number of Gray's photographs.

Finally, the exhibit portrays the conglomerate population of Zanzibar, for many centuries the main trade emporium of East Africa. Gray's pictures record the population of varied tribal and ethnic origins encountered on the narrow streets of Zanzibar City—Hindu merchants, turbaned Sikhs, Swahili fishermen, European businessmen and seamen, Muslim holy men, Arab sailors with long curved daggers thrust into their belts, Persians, and Chinese.

In his photographic studies, Dr. Gray's aim has been "to portray tribesmen as human beings rather than as scientific specimens." At the same time he has recorded visual aspects of tribal life which are difficult to communicate in other ways. Dr. Gray himself has selected the 68 pictures in this exhibition from a file of some 4,000 negatives taken during his East African field work.

Winter Hours

Beginning November 1 the Museum will observe winter hours of 9 A.M. to 4 P.M. Monday through Friday and 9 A.M. to 5 P.M. on Saturday and Sunday. These shorter hours will continue through February.

A FIELD REPORT FROM IRAN

(Continued from page 3)

August 6: Kosrow Sariri is leaving camp today for Tehran with about 11 skeletons and skins of *Mouflon* and our five goat specimens: two billys, one nanny, and two kids. In Tehran, Sariri will crate this shipment and send it on its way to Chicago.

The Game Council collected all of these specimens for us except for the two rams I took myself. I would like to have taken a billy, but when I had a chance,

Mouflon got in the way.

According to our altimeter, I have hunted as high as 14,300 feet. I took one ram at about 12,700—the other at 13,700—less allowance for any altimeter error. Breath comes a little hard when you first get to these altitudes, but I feel wonderful now—just when we're leaving!

Camp number two will be in the forest due north of us, and down to about 6,000 feet.

Honored

Dr. Austin L. Rand, Chief Curator of Zoology, was elected President of the American Ornithologists Union at the Annual Meeting held recently at Salt Lake City, Utah.

Staff Changes

William E. Lake, Museum Chief Engineer, retired last month after 42 years of service. "Bill" Lake came to Chicago Natural History Museum in 1920, just before construction on the present building was completed, and has served as Chief Engineer since 1939. His record of service is one of the longest in the Museum's history. Mr. Lake has moved to Ludington, Michigan, and he will be missed greatly by all his Chicago friends.



William E. Lake

On October 1, Mr. James R. Shouba, formerly Superintendent of Maintenance, was appointed to the new position of Building Superintendent. In this capacity, Mr. Shouba will coordinate operations relating to the Museum building and assume over-all responsibility for the Divisions of Engineering and Maintenance.

Mr. Leonard Carrion, formerly Assistant Chief Engineer, replaces Mr. Lake as Chief Engineer, and Mr. Jacques Pulizzi has been appointed Assistant Chief Engineer.

Mr. Gustav A. Noren, formerly Assistant Superintendent of Maintenance has

been appointed Superintendent of Maintenance to replace Mr. Shouba.

Museums Conference

Miss Miriam Wood, Chief of Raymond Foundation, and Mr. E. Leland Webber, Director, attended the Midwest Museums Conference held in Minneapolis during October. Mr. Webber participated in a panel discussion titled "Museums—Their Programs and Problems."

Free Concerts

Julius Katchen, European pianist touring America for the first time, will be the featured artist of the Free Concerts Foundation's second program for the season on Tuesday, November 27, at 8:15 P.M.

Third program in the Foundation's 1962-63 concert series will be a joint recital by Gerard Souzay, baritone, and Maureen Forrester, soprano, on Wednesday, January 16, at 8:15 P.M.

For free tickets to the concerts send a stamped, self-addressed envelope to Free Concerts Foundation, Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive, Chicago 5.

Audubon Lecture

The mountains, prairies, and vast wildernesses of the Province of Alberta are the subject of the full color motion picture, "Alberta Outdoors," to be presented in the James Simpson Theater on Sunday, December 9, at 2:30 P.M. Narrated by the well-known naturalist, Edgar T. Jones, the free program is sponsored by the Illinois Audubon Society.



CHICAGO
NATURAL HISTORY MUSEUM
Bulletin
Vol. 33 No. 12
December 1962

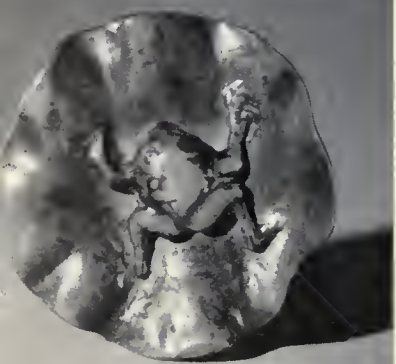
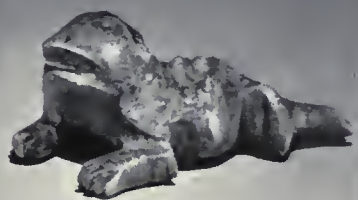
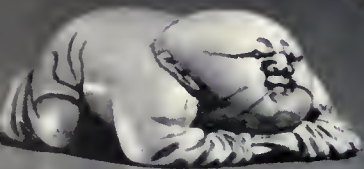


Fig. 1—Bronze bust of god, Serapis
(actual size 3½ inches)



SERAPIS

The Great God of Hellenistic Egypt
and the Greco-Roman World

by AL. N. OIKONOMIDES

Mr. Oikonomides is studying for a graduate degree in classical archaeology at the University of Chicago. Born in Greece, he is a graduate of the University of Athens. While Assistant Curator at the Acropolis Museum in Athens, and later at the Epidauros Museum, he participated in several excavations in his native country.

THE COLLECTION of Greek, Etruscan, and Roman antiquities at Chicago Natural History Museum is one of the most interesting in the Midwest. One of the most important specimens in the collection is a bronze bust, 3½ inches high, of the god Serapis (Fig. 1).

The worship of Serapis was introduced into Egypt by Ptolemy I (305–283 B.C.), and in the times of his successors the cult spread all over the Greco-Roman world. For the Egyptians the new god was yet another form of their old deity, Osiris; thus Serapis was worshiped in the traditional way together with Isis and Horus (or Harpocrates). For the Greeks and the Romans, however, Serapis represented a combination of the divine features of the three great sons of Saturn: Zeus, Pluto (or Hades), and Poseidon. An ancient Greek scholar has described this conception of the nature of Serapis:

*"The powers and honors of the other gods are separate; men call upon one god for this purpose, upon another for that purpose. He, the leader of the choir, holds the beginning and end of everything in his hand. . . . Hence there are those who worship this god alone, in the place of all the gods; and there are others who, though for each special purpose they resort to some particular divinity, yet couple Serapis with that divinity, as being Him to whom the whole world alike gives peculiar exaltation. . . . He has, as the poets would say, the keys of earth and sea; seeing that, even after life has come to its necessary end, Serapis remains still the Lord of men . . . who assigns its place to each soul. . . ."*¹

The most famous sanctuary of the new divinity was a monumental temple in Alexandria containing a cult statue of the god. Serapis sat on a richly decorated throne, clad in a chiton and himation of dark blue. The head of the god was of gold, and crowned with the traditional modius;² the face was sober, strong, yet mild and mysterious. The god's jeweled eyes gleamed through the darkened temple from the richly decorated and lighted cella. According to ancient sources, the sculptor who made the statue

¹Aristeides, Aelius, *Praise of Serapis*, written in the third century A.D.

²An ancient grain measure.

was Bryaxis the younger, a pupil of the famous Skopas.

On a gold bracelet in the Museum's collection (Fig. 4) the temple of Serapis at Alexandria, with the statue of the god wearing the modius, appears in relief. As far as I know, this is a unique representation of the temple and has only one parallel: the relief on a clay lamp from the Athenian Agora, which represents the local temple of Serapis, together with the cult statue of the god.

From the many statues and statuettes of Serapis known to be in various museums and collections, only a few are accepted as echoes or copies of the cult statue made by Bryaxis. The most famous of these copies are two busts in the Vatican Museum in Rome. The bronze bust in the Museum's collection (Fig. 1) belongs stylistically to the same group as the Vatican busts and is possibly the best bronze copy of this type in a museum in the United States. The "Chicago Serapis" can be dated between the second and first centuries B.C. Although a minor work of art of its period, it preserves clearly the fine features of its original. The eyes were jeweled, and on the modius olive tree branches were carved with very fine lines (now obscured by corrosion).

Three other representations of Serapis are also in the Museum's collection. A clay bust from Egypt dates from the Roman period (Fig. 5). The face is not preserved, but the copy is interesting because it tries to imitate the bronze busts. A clay lamp from Egypt also preserves a bust of Serapis in relief (Fig. 3). We recognize immediately the Bryaxis type, but the features are not clear because the mold was ruined by the time this lamp was produced.

A signet stone, with a bust of Serapis (Fig. 2), completes the set of "Serapis monuments" at Chicago Natural History Museum. It can be dated from the late Hellenistic period, but does not add new knowledge to the history of the statuary types.

"The market-places are full, and the harbors, and the broad places of the cities, with those who tell the manifold things Serapis has done. Should I seek to narrate them, though an unending series of



Fig. 2—A signet stone with a bust of Serapis (enlarged approximately three times)



Fig. 3—A clay lamp from Egypt with a barely discernible bust of Serapis appearing in low relief (actual size shown)



*ABOVE: Fig. 4
Gold bracelet in the design of the temple of Serapis in Alexandria, with the statue of the god in relief (enlarged approximately three times)*



*RIGHT: Fig. 5
A clay bust of Serapis, dating from the Roman period, found in Egypt (actual size shown)*

The Holiday Science Lectures—A New Program for Outstanding High School Students

Dr. Rene Jules Dubos, eminent microbiologist and pioneer discoverer of antibiotics, will be the speaker in a new series of Holiday Science Lectures to be given at the Museum for high school students of exceptional ability in science or mathematics. The program is sponsored jointly by the American Association for the Advancement of Science and the Museum.

Four illustrated lectures will be presented to outstanding students from the tenth, eleventh, and twelfth grades who have been nominated by public, parochial, and private high school principals from Chicago and the surrounding counties. The lectures will be given in the James Simpson Theatre from 10 A.M. to noon, beginning on Wednesday, December 26, and ending on Saturday, December 29.

Dr. Dubos, who is Professor at the Rockefeller Institute in New York, will speak on the subject, "Microbes in Health and Disease."

The Holiday Science Lectures were begun in New York City in 1959 as part of a continuing program of the AAAS to increase public understanding of science. Under a grant from the National Science Foundation the program was expanded to include, in 1961, the cities of San Francisco and Cincinnati. In 1962-63 Holiday Science Lectures will be presented, in cooperation with local universities or museums, in Chicago, Boston, New York, Seattle, and Los Angeles. Nationally known scientists scheduled to speak, in addition to Dr. Dubos, are: Dr. Lyman Craig, Dr. Theodosius Dobzhansky, Dr. Mark Kac, Dr. Stanford Moore, Dr. William Stein, and Dr. Paul Weiss.

The Museum is especially pleased that Dr. Dubos will deliver the Holiday Science Lectures in Chicago, since he is noted for his ability to write and speak as well as for his research. His most recent

book, *The Unseen World*, published this year, is an outgrowth of a similar series of talks he gave to selected high school students in New York when this program began.

Dr. Dubos is a member of the National Academy of Sciences, past president of the Society of American Bacteriologists, and an editor of the *Journal of Experimental Medicine*. His books include: *Pasteur and Modern Science*, published in 1960; *The Mirage of Health*, in 1959; *The White Plague—Tuberculosis, Man, and Society* (1952), and in 1961, *The Dreams of Reason*. Among the many awards he has received for his contributions to science, the most recent are the Robert Koch Centennial Award of the Koch Institute in Berlin in 1960, and the Modern Medicine Award for Distinguished Achievement in 1961.

Souzay Returns in Free Concert

Gerard Souzay, French baritone, whose performance in the Free Concerts Foundation's program series last year received praise from critics and public alike, will return to the stage of the James Simpson Theatre on Wednesday, January 16, for a joint recital with Maureen Forrester, soprano. The concert will be the two vocalists' only Chicago appearance in their first joint concert tour of America. The program begins at 8:15 P.M.

For free tickets to the concert send a stamped, self-addressed envelope to Free Concerts Foundation, Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive, Chicago 5.

Winter Hours

On Christmas Day, December 25, and New Year's Day, January 1, the Museum will be closed to enable the Museum's staff to spend the holidays with their families. During December, January, and February, the Museum is open from 9 A.M. to 4 P.M. Monday through Friday, and from 9 A.M. to 5 P.M. on Saturday and Sunday.

Chicago Natural History Museum

Founded by Marshall Field, 1893
Roosevelt Road and Lake Shore Drive, Chicago 5
Telephone: WAbash 2-9410

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Audubon Lecture

"Alberta Outdoors," a color motion picture about the mountains, prairies, and vast wildernesses of the Province of Alberta, will be presented in the James Simpson Theatre at 2:30 P.M. on Sunday, December 9, by the Illinois Audubon Society. The film is narrated in person by Edgar T. Jones.

Cultural Groups Visit "Art of Benin"

A number of Chicago's cultural organizations have scheduled programs at the Museum centered around the current exhibition, "The Art of Benin."

Among groups that have already viewed the centuries-old bronzes from Africa is the Society for Contemporary American Art. Sixty of their members attended a dinner meeting on November 13 in the Museum.

Another group that toured the exhibition in November were participants in the University of Chicago's Fine Arts Program, students of Mr. Theodore Halkin, artist in the Department of Anthropology.

On December 6, the Committee for Roosevelt University's African Studies Program will hold a dinner meeting at the Museum especially to see the exhibition

of African court art. The evening's program will include a performance of African dancing, singing, and drums by the Chicago chapter of the Pan-African Student Organization in the Americas.

Also in December, members of the South Side Community Art Center have arranged a tea in the Museum and a viewing of the exhibition at that time.

The exhibition remains on display through December 9 only.

Geology Staff Artist Appointed

Dr. Tibor Perenyi, Hungarian-born sculptor, was appointed Geology Staff Artist on October 1. He fills a position that has been vacant since the resignation of Mrs. Maidi Wiebe Leibhardt earlier this year.

Dr. Perenyi brings to the Museum a wide background of experience in the field of art. Before leaving Hungary in 1956, Dr. Perenyi had achieved national recognition as a portrait sculptor. His busts of prominent people and of children had been displayed in numerous art exhibitions in Budapest and he was a permanent exhibitor in the annual Winter Exhibition of the Hungarian Museum of Fine Arts.

When he arrived in the United States, Dr. Perenyi was immediately commissioned by a number of Americans to do several busts. For the past three years he has been designing and painting anatomical models for a leading firm in this field, while continuing his work as a freelance sculptor.

New Museum Journey for Children

Why does the earth look the way it does? What forces of nature are constantly at work changing the face of the earth?

The Museum's new winter Journey for children, "Understanding Scenery," provides answers to these questions in a carefully plotted trip to exhibits that show the variable surface of our planet and explain how it got that way. A question-

Gift Suggestions from the Book Shop

Here are just a few of the many items now available at the Museum Book Store which should please a number of persons on your holiday shopping list. Prices mentioned include tax and postage.

Museum Stories. These booklets have been written by the Museum staff to stimulate the curiosity of young readers about man and the world around him. They form a junior encyclopedia of natural history. Each story book contains approximately 12 pages with black and white illustrations. A complete set of 30 booklets is \$6.75.

Songbirds of America. A high fidelity recording, accompanied by text and commentary, with full color photographs of 26 familiar song birds. This 10" x 10" volume is available at 33½ rpm for \$5.20.

Precious Stone—Gemstone Set. A collection of 30 genuine rough stones from around the world. This set contains a synoptic tables of names, hardness, specific gravities, refractive index, crystal forms, chemical formulas, and places of origin at \$4.35.

As usual, the Book Shop carries a wide selection of books on art, anthropology, botany, geology, and zoology, which make fine gifts for both adults and children. Jewelry and craft objects from many countries are also available to help make your Christmas shopping easy and pleasant.

naire to be filled out on the Journey is available at the Information Desk and at the north and south entrances to the Museum. Children who deposit a completed questionnaire in the boxes provided at each door will receive credit leading to a certificate of award. All Journeyers are honored at a special awards program held twice each year at the Museum.



Director E. Leland Webber (center) and Philip H. Lewis, Curator of Primitive Art (left), discuss the Museum's current special exhibition, "The Art of Benin," with three members of the Society for Contemporary American Art: (from left to right) Mrs. Albert H. Newman, Mrs. Charles F. Cutter, and Mr. William E. Hartmann, President of the Society.



Field Work in Iran Continues

**Camp Two, Near Sama
North Slope, Elburz Mountains**
(4,200 feet elevation)

August 24: That good man, Kosrow Sariri,¹ turned up in camp on the night of the 22nd, not only laden with such desiderata as butter, fruit, cookies, bread, and loafcake, but with a stack of letters. We were delighted to hear from the Museum. By now you will have heard about the wild sheep and goat specimens which are en route. We thought hunting that group of animals quite exciting.

At this moment there is much activity in camp. Douglas is skinning the first hare over in front of his tent under the interested eye of a villager who resembles, more than a little, a brigand. Kosrow Sariri and Nicola, our driver, have started a fire under a huge copper kettle borrowed from the village and are boiling bear bones. Bill is well away from

the tents skinning a jackal, while I sit under a huge walnut tree happily writing to you.

So far we have taken 27 mammal species in all. At this camp we have added to the collections a doe and a fawn maral,² one roebuck, one bear beautifully silver tipped, three jackals, one hare, one pig, plus some bats, rats, and mice. The dormice are large and fluffy tailed—very pretty. They live in the walnut trees. The ones caught here are rolling fat, but the ones Doug took at 6,000 feet are much thinner by comparison.

The hunting here is rather hard; the hills are dry, the padding of leaves and twigs extremely crackly. The night hunting has not yet produced very much. Bill and Doug sit in the spare tires on top of the truck and come leaping down when they see any shining eyes. It's slim picking, but we are rather pleased with what we have obtained.

² Maral is a name for the large Persian form of the red deer, *Cervus elephas*.

Janice K. Street

Mrs. Street continues the narrative, begun in the November BULLETIN, of the W. S. and J. K. Street Expedition of Chicago Natural History Museum to Iran. Members of the expedition include her husband and the expedition's leader, Mr. William S. Street, and mammalogist Douglas Lay.

The trip over the Chalus Road down here to our second camp was spectacular. We drove to 10,000 feet, then through a one-lane tunnel over a mile long. On the other side of it we started down one horseshoe curve after another. In places we went through narrow canyons cut through the rocks, sometimes with great overhangs of rock.

We passed through a couple of villages where houses were of stone and mud, usually with no windows. The village shop, if there was one, was merely a dark hole in a wall. Always, though, a table or two with chairs, where you could stop

¹ Representative of the Game Council of Iran who has acted as "chief-of-staff" for the expedition.

LEFT: William S. Street kneels to photograph one of his field "prizes" held by Douglas Lay.

for tea, were set out by the road. Or in an out-of-the-way place you might see a man with a samovar, and one or two little glasses on china saucers, selling tea. The tea is served in the glass, you then pour the tea in the saucer, put a sugar lump in your mouth, and drink from the saucer.

At Pal-e-Dowab (under 2,000 feet elevation), we turned off the main road and traveled about 15 miles over a rough, rocky, winding side road to camp. It took us two hours, and we felt shaken up for the first time. The camp is at 4,200 feet, with hills on both sides and higher mountains beyond. It is delightful. I have the same feeling here that I did at Doab, of hills overlapping as far as one can see.

The hills are dry with scrub growth (much thorn bush), which grows heavier as you go up higher toward the forest. Yet in spite of the dry hills and rocky terrain there is a feeling of lushness in the green fields of rice and arzan, the great walnut trees, and the small vegetable gardens. Every so often there is an oasis. In the center of a velvet green field one may see several piles of stones placed there when the field was cleared. All the fields are tilled and worked by hand or with the aid of crude implements.

Looking from our tent down-valley we see green fields, trees, berry bushes, and other crops. They give the appearance of lavishness but do not show how hard the people work to wrest a living from the hill. They have done a remarkable job putting in the irrigation ditches which make the green possible. Back of us to either side a narrow valley runs between high rock cliffs and winds, slowly climbing, among the bases of the hills. These hills are rugged looking and splendid, with green trees growing out of the rock. There are many thistles all around us—some yellow, some just plain thistle color, but the ones I love are a periwinkle blue. There are also blue daisies, and, believe it or not, blue butterflies to match. Charming!

The village of Sama is quite close. The people have very, very little. Many of the children have immense tummies from dietary deficiency. But they are a friendly, happy people. In the early morning we hear the boys taking the

cattle, and the men starting out with mules or horses for the fields, going along the trails on either side of camp, singing and laughing.

The houses are stone, chinked with mud and straw. One affluent citizen, whose house is walled away from the rest, allowed us to look inside. There were three rooms: one, the kitchen area—very cool inside, with plastered walls. Across one corner hung a baby bed. A sack of wheat and a sack of another grain stood side by side. In one corner a collection of elegant copper utensils and a kerosene single burner. On the lone shelf, two lamps. The next two rooms were locked and identical—large, high-ceilinged, and deliciously cool. On the floor were lovely Persian rugs. Neat bed rolls with round pillows on top were stacked at the back. In the yard were rugs and mats with arzan and wheat spread on them to dry.

We went to the village armed with two cameras, one a Polaroid, and a pocket full of balloons. At first the women all covered their faces and ran to hide. I took a picture of two youngsters and had them show it. That did it. We were swamped. Everyone wanted "aks" (pictures). It was an interesting experience, photographing the women with babies on their backs and tiny chil-

dren carrying babies. The women and children all dress alike: a long, full printed cotton shirt; then a shift, perhaps red or a print, goes over that, split on the sides for freedom in walking. Some women also wear a sleeveless jacket that may have silver-looking coins on the edges. Always a scarf is tied over and around the head, back far enough to show a piece of hat attached to the scarf. It's shaped like the front of an overseas cap—black with silver braid and a touch of red. With their first reticence over, the women now come to camp in ones or twos each day for a picture, and have lost all shyness.

Douglas is going to be away for a couple of days working the traps for a few mice in another area. He had hoped to go up the mountain today for more dormice, but for the first time there are low clouds and fog, and he will have to wait.

A few days ago, Bill took off with Isa, the local Game Council man. They left camp and started straight up the mountains where they hunted and camped at 6,500 feet, then went on up to 8,400 where the two maral were taken. A beautiful, but precipitous piece of country, with extremely large trees, six to eight feet through: alders and beeches, with

(Continued on next page)



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thousands of trilliums below. Holly, too.

One thing I can say, this country is good for the waistline. We've all tightened up the belts a bit, which calls for some boasting. Bill is doing his best to have the same waistline measurement as Doug. I measure each of them every few days. (Just between the two of us, I pull the tape tighter when measuring Bill!) Before too long we will move on to the Caspian.

Camp Six, near Rezaiah On the banks of the Bardasar Chay (River)

September 18: Our tents are set up among the willow trees overlooking a small river—really a stream—some distance from the road. A hill rises directly behind us and an old flour mill is built into it. Made of rock and mud, it's been there for over a hundred years. The miller grinds the wheat on a stone wheel. The mill is built over water ditches, so he controls the water. We are almost surrounded with ditches.

The mill is built on three levels: one where the wheat is poured, one where the miller (a nice gentle soul who looks as though a breath of wind would blow him away) keeps his meager belongings, and the lowest where the wheel is, and a trough into which the flour falls. Outside, in a large flat area, the wheat is sifted before being ground.

Driving from Chalus westward along the Caspian coast, we experienced some delightful moments. We enjoyed seeing the tea plantations. Through binoculars we could see the neat rows of tea plants way up the mountain sides. Girls in gaily colored dresses were picking tea leaves in the fields. The tea factories are the best looking buildings we have seen, painted and surrounded with gardens.

Beyond Bandar Pahlavi we drove through miles of wild pomegranate, some in bloom, some with fruit.

At Astara we stopped at a small caviar packing plant. It comprised two square rooms, not large, connected by a roofed passageway. One room held the vats for sturgeon. The caviar is put in salt water, then drained in large sieves. In the other room, the caviar was packed. The place was painted white and blue and was very clean.

SERAPIS

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days ran on and on, the list would still be incomplete. For his mighty works have not come to a standstill: there are more today than yesterday. Each day, each night, adds new ones to the tale."

The conception of one almighty god in Hellenistic religion, as incorporated in the image of Serapis, spread throughout

the Mediterranean. The most efficient propagators of his worship were the sailors and mariners who carried the cult to the Black Sea and the coast of the Atlantic Ocean. The temple of Serapis at Eboracum, near York, in Britain, and the cults at Silchester and London, give an idea of the northern boundaries of the god's worship in the ancient world.

Beyond Astara we drove over plateau country, 5,200 feet high. It reminded us of eastern Washington. Dry farming was done and we saw quantities of wheat being threshed with water buffalo or by hand. Plowing was done with a buffalo and crude implements. Tremendous amounts of land were under cultivation. Every bit of green was being gathered and stored.

Here we began seeing the Turkish style villages. They are completely different from the others, with square mud houses, flat-roofed, and a series of courts seemingly connecting everything. There were a few small windows, or more often just a door. Many of the houses were

built wall to wall. Elsewhere, winding walkways ran between quite high walls.

The flat roofs of the houses were used for storage, as was evidenced by the stacks of straw and the high, cone-shaped stocks of winter fuel—patties of cow dung and straw. After being made, these are dried on the walls. The villagers' cattle and sheep looked very good, and where land has been irrigated, vegetables were growing.

Ardabil was a busy town. We were intrigued by the many horse-drawn carriages. There wasn't one in good repair. The fenders were frayed and merely tied on, the upholstery was torn and patched—but the driver sat high and proud in his ragged coat. Many of the carriages were painted blue or red and decorated with a row of colored flowers. The horses not only sported beads and bells, but red yarn tassels or pompoms were attached in several places.

Two-wheeled carts carried tanks of water to sell. Children would run out and try to turn the spigot on and take some water. The driver carried a stick and when he saw them he would leap off and give chase. Meanwhile, the horse just plodded on.

This is a fertile valley, with much tobacco and large vineyards. Both crops are being picked now and dried. There is also a large sugar factory. While some sugar beets are grown in this vicinity, most are sent in from Khoi and other places. Melons grow everywhere, and these are the sweetest yet.

A few days ago, Bill, Nicola, and I left camp at 8:30 A.M. and took off to find new jerboa fields. We had been told that the jerboas sometimes came out in daytime. Found a most promising looking field, loaded with burrows, but saw no animals. Decided to return at dusk,
(To be continued)

THE COVER

Chinese belt toggles, photographed to almost exact size, create an unusual checkerboard effect on this month's cover. What are belt toggles? As their photographs show, they are beautifully fashioned objects, two to three inches in size, made from ivory, wood, lacquer, metal, jade, or other hard materials, including seeds. Traditionally, belt toggles were used by Chinese gentlemen as counterweights for various personal accessories—cases for pipes, fans, and spectacles, portable writing sets, portable eating kits—which were carried suspended from a cord looped over the belt. Most of these toggles date from the 19th Century, but some are older, including one inscribed with the date, 1403. The 20 pieces pictured on the cover are part of a collection of 237 recently presented as a gift to the Museum by Miss C. F. Bieber of Santa Fe, New Mexico. All will be displayed in the Museum's hall of Chinese and Tibetan ethnology (Hall 32) whose reinstallation is in progress.